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CYANOTOXINS IN DRINKING WATER

HEARING

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENT AND THE ECONOMY

OF THE

COMMITTEE ON ENERGY AND COMMERCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

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CYANOTOXINS IN DRINKING WATER

WEDNESDAY, NOVEMBER 19, 2014

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENVIRONMENT AND THE ECONOMY,
COMMITTEE ON ENERGY AND COMMERCE
Washington, DC.

The subcommittee met, pursuant to call, at 10:18 a.m., in room 2322 of the Rayburn House Office Building, Hon. John Shimkus (chairman of the subcommittee) presiding.

Members present: Representatives Shimkus, Latta, Harper, McKinley, Bilirakis, Johnson, Tonko, and Barrow.

Staff present: Nick Abraham, Legislative Clerk; Leighton Brown, Press Assistant; Jerry Couri, Senior Environmental Policy Advisor; David McCarthy, Chief Counsel, Environment/Economy; Tina Richards, Counsel, Environment; Chris Sarley, Policy Coordinator, Environment & Economy; Jacqueline Cohen, Democratic Senior Counsel; and Ryan Schmit, Democratic EPA Detailee.

OPENING STATEMENT OF HON. JOHN SHIMKUS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. SHIMKUS. I call the subcommittee to order, and the chair will recognize himself for 5 minutes for an opening statement.

Today's subcommittee will be taking a look at the harmful algal blooms in drinking water, including the source water used for drinking. I thank Representative Latta for his efforts on this issue, for bringing it to the subcommittee's attention. He has delved into the minutiae of this issue in search of a useful and long term solution to this problem. Having sat in some of the meetings with Mr. Latta that he has been having on this issue, I realize what a complex and widespread issue this is, but one which only gained national attention a few months ago.

Some folks may be tempted to think that there are easy solutions to this problem, but I caution jumping to simple or sweeping conclusions. There is no single smoking gun that leads to algae based toxins in drinking water. I believe we will hear our witnesses say that there are still plenty of things that we don't know about this subject.

I understand from drinking water treatment professionals that many types of cyanobacteria and diversity of the habitat make it complicated to predict the precise conditions favoring their growth. Physical factors that affect whether cyanobacteria grow include available light, weather conditions, water flow, temperatures, and mixing within the water column. Acidity and nutrient concentrations, including those from municipal wastewater, urban lawn and

golf course management, and agricultural processes all contribute to algal bloom growth. In addition, we will hear testimony that experiencing a blue-green algae bloom does not always mean there is a cyanotoxin problem.

We need to know more about this issue. We understand that there are—at least 35 states have reported blue-green algal blooms, but we need to separate out the drinking water concerns from those seen in the recreational waters context. This hearing is meant to focus on the Safe Drinking Water Act, not lawns in other subcommittees or committees, whether that be a regulation of nitrogen disposition under the Clean Air Act or nutrient management under the Clean Water Act.

There are plenty of questions within the context of ensuring the provision of safe drinking water that we should focus on and learn about today. Our hearing will allow us to focus on where we are with our understanding of the U.S. EPA's effort on better grasping blue-green algal—algae in the drinking water context, including health effects and current data, monitoring and testing techniques, and public health communication strategies. We will also hear from witnesses on what happened this past August in Ohio, and what lessons we learned. Finally, we will get a better sense of what drinking water treatment professionals are doing to better prepare to handle these events.

I want to thank the witnesses for being here today, and yield the rest of my time to Mr. Latta.

[The prepared statement of Mr. Shimkus follows:]

PREPARED STATEMENT OF HON. JOHN SHIMKUS

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public health communications strategies. We will also hear from witnesses on what happened this past August in Ohio, and what lessons were learned. Finally, we will get a better sense of what drinking water treatment professionals are doing to better prepare to handle these events.

Mr. LATTA. Well, thank you, Mr. Chairman, and thank you very much for holding this very important hearing today. I really appreciate it and your interest in the subject, because it affects so many millions of Americans,

First, I would like to recognize one of our witnesses today from my home state, Ohio EPA Director Craig Butler. Mr. Butler has been director of the Ohio EPA since early 2014, and previously served in the governor's administration as the assistant policy director for energy, agriculture, and the environment. I have had the pleasure of working with Director Butler on issues of great importance to Ohio. I am grateful that he is able to be here today to share his expertise and insights with the subcommittee.

The United States is truly fortunate to have a vast amount of surface water. It provides immense value to our nation's ecosystem and economy, as well as drinking water to countless Americans. To me, nowhere is this more evident than the Great Lakes, the largest surface freshwater system on Earth, that provides drinking water to tens of millions of people.

Unfortunately, cyanotoxins in public drinking produced from harmful algal blooms are presenting a serious concern for our health. This past August, half a million people in the Toledo area, many of which are residents of my district, were unable to utilize their public drinking water for over 2 days without risking potentially negative health effects due to the high level of cyanotoxins, microsystems—detected in the city's public water supply. During that time, both concerns and questions were raised about testing protocols, treatment process, appropriate responses on how to respond to the problem in the short term.

I know from my personal experience that the State, including Director Butler, and the U.S. EPA worked tirelessly with the local water utility to get the situation under control. I commend their hard work, and the steps they have taken since to try to ensure this does not happen again.

However, I believe to fully protect our citizens' public drinking water from cyanotoxins, it is imperative that Federal, State, and local governments work together to better understand the science and human effects of cyanobacteria and cyanotoxins, as well as the best utilization of available testing, monitoring, and treatment technology.

I am confident, by working together, we can accomplish this. I look forward to today's hearing, and hearing from our witnesses on what types of strategies, actions U.S. EPA would take to close these gaps and improve human health and environmental protection. And with that, Mr. Chairman, I would yield back my time, and also I would ask that I have a letter from the Ohio Farm Bureau that I would like to have inserted into the record.

Mr. SHIMKUS. Without objection, so ordered in.

[The information appears at the conclusion of the hearing.]

Mr. SHIMKUS. And with that, I turn to Ranking Member Paul Tonko for 5 minutes for an opening statement.

OPENING STATEMENT OF HON. PAUL TONKO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. TONKO. Thank you, Mr. Chairman, and good morning to each and everyone. Thank you again, Mr. Chair, for scheduling a hearing on what I believe is a very important topic. Water is an essential resource. It has no substitute. Although 70 percent of the planet's surface is covered with water, only a small fraction of that is of sufficient quality to serve our needs.

Much of the Eastern half of the United States is blessed with ample freshwater resources, and no region is more well-endowed than the areas bordering the Great Lakes. The Great Lakes contain 21 percent of the Earth's surface freshwater supply, and 84 percent of the United States' surface freshwater supply. We share these resources with Canada, and they are vitally important to the well being and economic fortunes of over 30 million people living within the eight states of our nation, and province of Ontario. The importance of this resource cannot be understated. We must protect it.

I am reminded by my colleague, Representative Kaptur about the importance of water quality, and the impact on her area with this issue. The algal bloom that resulted in Toledo's residents losing the use of their tap water is not a new problem. In part because Lake Erie is the shallowest lake, with the warmest waters, algal blooms have been a well-known problem for decades. Investments made in better sewage treatment and control of point sources in the 1960s and 1970s improved the situation for a time. But the steady input of nutrients from agricultural operations, especially from the Miami Watershed, expanded populations of invasive species, and changes in weather patterns have continued to fuel harmful algal blooms.

We cannot do much about the weather patterns, but we can do much better in managing nutrient inputs and invasive species. Mr. Donahue points out in his testimony that the cost of these blooms, and for treating water to remove the resulting toxins, is falling on the water utilities and their customers. That is true, but the cost of these algal bloom events are even larger than that, and they are also falling on other individuals and businesses that rely on a clean, bloom free Lake Erie to support tourism, to support recreation, to support fisheries, and other activities.

The International Joint Commission released a report this past February with 16 recommendations for action by the governments of the states and province within the Great Lakes Basin. The report identifies phosphorus loading as a key driver for the increased intensity and frequency of harmful algal blooms in Lake Erie. Seven of the recommendations specifically target phosphorus nutrient loading from agricultural lands. This is the largest unchecked input of nutrients to the lake.

Farmers do not wake up every morning with a plan to cause algal blooms in Lake Erie, or any of the other water bodies that are experiencing this problem, but it is happening as a result of farming practices, and the problem needs to be addressed. Agriculture is important to this region, and to our nation, and agriculture also relies on a good supply of water. The goal here is to strike an appropriate balance that keeps farms economically viable

and productive, but reduces the transport of soil and nutrients off the land. There is no denying that agriculture practices result in nutrient runoff at levels that cannot continue if we are to get these blooms under control.

The good news is that our land grant universities, the Natural Resource Conservation Service, and others have developed best management practices that can be adopted to achieve some of the needed reduction. And EPA has been working with states of the Chesapeake Bay Watershed to implement basin-wide nutrient management plans to address similar problems that we have noted in the Chesapeake Bay. Nutrients that are coming off of fields are not benefitting anyone. Better nutrient management will not only benefit water quality, it will benefit farming also.

Until we get these blooms under control, we are going to need better information for water utilities and the public about the toxicity of these blooms. But to truly ensure the safety of drinking water supplies, we will need to take serious steps to correct the source of the problem. These blooms not only jeopardize public drinking water supplies, they result in dead zones due to lack of oxygen when the blooming organisms die, and sink to the bottoms of lakes and estuaries.

Ultimately, it is less expensive to prevent pollution than it is to clean it up. This problem is not unique to Lake Erie. It is happening in other places as well. We are all dependent upon clean water supplies, and we all must work together to better manage these vital resources. Maintaining safe drinking water available to every household through the tap is one of the conveniences that define a modern society. We cannot compromise on that guarantee.

We have an excellent panel of witnesses before us today. I look forward to hear your testimony, and I thank you for participating in this very important hearing. And, Mr. Chair, I hope we will be able to spend time over the next 2 years finding a way to address the backlog of drinking water infrastructure needs that we have in communities across this great country. I would welcome an opportunity to work with you and other members of the committee on this important issue in the next Congress. And with that I yield back, and thank you again.

Mr. SHIMKUS. Gentleman yields back his time. Any other member seeking time for an opening statement? Seeing none, we would like to welcome Dr. Peter Grevatt. He is the Director of Office and Groundwater and Drinking Water at the United States Environmental Protection Agency. Welcome, sir. You have 5 minutes. We are not going to be draconian on time, and then we will go to questions. So, welcome.

STATEMENT OF DR. PETER GREVATT, DIRECTOR, OFFICE OF GROUND WATER AND DRINKING WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. GREVATT. Yes, sir, thank you. Good morning, Chairman Shimkus, Ranking Member Tonko, and members of the subcommittee. Thank you for the opportunity to testify on EPA's activities to address harmful algal blooms and their impact on drinking water supplies. Today I will discuss the health effects of cyanobacteria and cyanotoxins, the incident in Toledo this summer,

authorities under the Safe Drinking Water Act, and strategies for preventing harmful algal blooms.

Cyanobacteria are found naturally in surface waters, and can rapidly multiply, causing harmful blooms. Factors that enhance bloom formation include light intensity, nutrient availability, water temperature, and water column stability. Some species of cyanobacteria produce toxic compounds known as cyanotoxins. High levels of cyanotoxins in recreational waters, and drinking water, may cause a wide range of adverse health effects in humans, including fever, diarrhea, vomiting, and allergic reactions.

While the risk associated with low levels of cyanotoxins in drinking water is uncertain, the effects reported following exposure suggest that this is an important issue for us to address. Communities on Western Lake Erie, including Toledo, remain vulnerable to emergency shutdowns from harmful algal blooms.

On the morning of August 2, Toledo Mayor Collins issued a don't drink or boil advisory to the nearly 500,000 customers in response to the presence of microcystin in the city's drinking water, leading to the declaration of a state of emergency by the governor, and mobilization of the Ohio National Guard to provide emergency drinking water supplies.

The presence of the toxin was due to a harmful algal bloom near Toledo's intake on Lake Erie. The U.S. EPA performed sample analyses to confirm the concentrations of algal toxins, and worked with the State of Ohio and the City of Toledo to identify the optimal approach for controlling the toxins at the utility. When treatment adjustments led to the reduction on cyanotoxin concentrations, Mayor Collins lifted the advisory on Monday, August 4.

Currently there are no U.S. Federal regulations concerning cyanotoxins in drinking water. The Safe Drinking Water Act establishes a number of tools, including health advisories, the contaminant candidate list, and the Unregulated Contaminant Monitoring Rule to develop regulatory and non-regulatory approaches to addressing contaminants in drinking water. EPA is preparing health advisories for microcystin and cylindrospermopsin, two cyanotoxins commonly associated with harmful algal blooms.

The health advisories will establish concentrations of drinking water contaminants below which adverse health effects are not anticipated to occur, as well as provide states, and municipalities, and other local officials with technical guidance on sampling, analytical procedures, and drinking water treatment recommendations to protect public health. We expect to finalize these health advisories in 2015.

EPA's contaminant candidate list identifies unregulated contaminants that are known or anticipated to occur in public water systems which may require regulation. The EPA uses this list to prioritize research and data collection efforts. My office has listed several cyanobacteria and cyanotoxins on the three contaminant lists that have been developed.

EPA uses the unregulated contaminant monitoring rule to collect data for contaminants that do not have primary drinking water standards, and are suspected to be present in drinking water. A lack of standardized analytical methods for individual cyanotoxins has prevented EPA from including them in the current and pre-

vious rounds of the unregulated contaminant monitoring rule. The agency is currently developing specific analytical methods for microcystins, anatoxin-a, and cylindrospermopsin. EPA expects these methods to be available in 2015 in time to consider including several cyanotoxins in the fourth unregulated contaminant monitoring rule. Monitoring for the fourth round of UCMR will begin in 2018.

While monitoring and treatment are critical for providing safe drinking water, this year's incident in Toledo illustrates the difficulties of removing those contaminants at the treatment plant. Shortly after the Toledo incident, EPA redirected $12 million in Great Lakes Restoration Initiative funding to Federal and State agencies to strengthen ongoing efforts to target harmful algal blooms in Western Lake Erie. Continued source water protection efforts, and adequate investment in our nation's infrastructure, will be necessary to prevent events such as the one in Toledo in the future.

Once again, Chairman Shimkus, Ranking Member Tonko, and members of the subcommittee, thank you for the opportunity to discuss EPA's work on cyanotoxins in drinking water, and I look forward to answering any questions you may have.

[The prepared statement of Mr. Grevatt follows:]

TESTIMONY OF
PETER C. GREVATT, Ph.D.
DIRECTOR
OFFICE OF GROUND WATER AND DRINKING WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
HOUSE COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

November 19, 2014

Good morning, Chairman Shimkus, Ranking Member Tonko, and members of the Subcommittee. I am Peter Grevatt, Director of the U.S. Environmental Protection Agency's Office of Ground Water and Drinking Water. Thank you for the opportunity to testify today on the EPA's activities to address cyanobacterial harmful algal blooms (CyanoHABs) and their impact on drinking water supplies.

Incident at Toledo's Collins Park Water Treatment Plant

On Friday August 1, 2014, officials at Toledo's Collins Park Water Treatment Plant notified the Ohio Environmental Protection Agency (Ohio EPA) and U.S. EPA of an elevated sample reading for the algal toxins Microcystins. On the morning of August 2, Toledo Mayor Collins issued a "do not drink or boil" advisory, as recommended by Ohio EPA, to the nearly 500,000 customers served by the water system, leading to the declaration of a state of emergency by Ohio Governor Kasich and mobilization of the Ohio National Guard to provide emergency drinking water supplies to the impacted residents. The presence of the toxin was related to a cyanobacterial harmful algal bloom (CyanoHAB) near Toledo's drinking water intake on Lake Erie.

In an effort to verify the results, the public water system requested independent laboratory analysis by the neighboring Oregon Water Treatment System, Ohio EPA, U.S. EPA, and Lake Superior State University. The U.S. EPA performed sample analyses throughout the course of the weekend to confirm the concentrations of algal toxins and to help identify the optimal approach for controlling the toxins at the treatment plant and in the distribution system. Subsequent adjustments at the treatment plant led to reductions in the concentrations of algal toxins in the distribution system, and Mayor Collins lifted the "do not drink or boil water" advisory and returned services to its customers on Monday, August 4.

Causes of CyanoHABs

Cyanobacteria are photosynthetic bacteria that share some properties with algae and are found naturally in surface waters of lakes and ponds. When conditions are favorable, cyanobacteria can rapidly multiply in surface water and cause harmful blooms. Favorable conditions that enhance bloom formation and persistence include light intensity and duration, nutrient availability (such as nitrogen and phosphorus), water temperature, pH, water flow, and water column stability. Some species of cyanobacteria produce toxic compounds, known as cyanotoxins.

Based on the surveys that have been carried out to date in U.S. waters, the most commonly identified cyanotoxins are Microcystins, Cylindrospermopsins, Anatoxins and Saxitoxins. The specific means by which these factors promote the growth of cyanobacteria are not well understood. Point sources (which may include discharges from sewage treatment plants and concentrated animal feeding operations) and non-point sources (which may include diffuse

runoff from urban stormwater, roads and agricultural fields), can contribute the excess nitrogen and phosphorus that can promote the growth of CyanoHABs.

Health Effects of CyanoHABs

The presence of high levels of cyanotoxins in recreational waters and drinking water may cause a wide range of adverse health effects in humans including fever, headaches, muscle and joint pain, blisters, stomach cramps, diarrhea, vomiting, mouth ulcers, and allergic reactions. There have also been many documented reports of dog, bird, and livestock deaths throughout the world as the result of consumption of surface water with cyanobacterial blooms. While the precise levels of risk associated with low levels of cyanotoxins in drinking water is uncertain, the serious health effects reported following exposure of humans and pets to cyanotoxins suggest that this is an important issue to address in the nation's drinking water supplies.

Authorities Under the Safe Drinking Water Act

Currently there are no U.S. federal regulations concerning the management of harmful algal blooms in drinking water under the Safe Drinking Water Act (SDWA). The EPA has been working on finalizing health advisories for two cyanotoxins commonly associated with CyanoHABs, Microcystins and Cylindrospermopsin; available data on Anatoxin-a is not robust enough to develop a health advisory at this time. These non-regulatory health advisories will establish concentrations of drinking water contaminants below which adverse health effects are not anticipated to occur. In addition, the EPA has been actively collaborating with our stakeholders for several years by conducting studies to identify and evaluate causes, detection, treatment, and health and ecological effects in the U.S. The EPA is also collaborating with states

and Canada to establish harmonized policies for cyanotoxins at the federal, state and cross-border levels.

The Contaminant Candidate List (CCL) and the Unregulated Contaminant Monitoring Rule (UCMR) are two tools that SDWA establishes for identifying contaminants that may be subject to regulation in the nation's drinking water supplies. My office has listed cyanobacteria and cyanotoxins on the three drinking water CCLs that the EPA has published and is considering including Microcystins and other cyanotoxins in the fourth round of UCMR.

The CCL is a list of unregulated contaminants that are known or expected to occur in public water systems in the U.S. that occur at a frequency and at levels of public health concern and where there is a meaningful opportunity for health risk reduction. The EPA uses this list of unregulated contaminants to prioritize research and data collection efforts to help us determine whether we should regulate a specific contaminant. Based on toxicological, epidemiology, and occurrence studies, my office has focused on three of the more than 80 variants of cyanotoxins, recommending Microcystins, Anatoxin–a and Cylindrospermopsin for further steps to consider for regulation under SDWA.

The EPA uses the UCMR to collect data for contaminants that do not have primary drinking water standards and are suspected to be present in drinking water. A lack of standardized analytical methods for individual toxins has prevented the EPA from including cyanobacterial toxins in the current and previous rounds of UCMR. The agency is currently working on the development of improved analytical methods for cyanotoxins to support a nationwide monitoring

effort for Microcystins, Anatoxin-a, and Cylindrospermopsin through the UCMR. These analytical methods will allow more specific measurement of cyanotoxins at lower concentrations and with greater accuracy and precision. Upon successful validation, the EPA expects to publish these methods in calendar year 2015, in time to consider including several cyanotoxins in the fourth UCMR.

Monitoring for the fourth round of UCMR will begin 2018. However, given the urgency for responding to the ongoing challenges related to CyanoHABs, the EPA is identifying additional strategies for gathering robust data on the regional and national occurrence of CyanoHABs, such as collaborating with states and other federal agencies, including the U.S. Geological Survey and the National Oceanic and Atmospheric Administration. The 2014 reauthorization of the Harmful Algal Bloom and Hypoxia Research and Control Act (P.L. 113-124) authorizes the EPA, working with an interagency task force led by NOAA, to administer the freshwater HAB program.

The EPA expects to finalize the health advisories for two cyanotoxins commonly associated with CyanoHABs in 2015. Health advisories are not federally enforceable standards, but are intended to provide states, municipalities, and other local officials with technical guidance for protecting public health or for the development of their own guidance. The EPA is currently conducting an independent external peer review of the draft health advisory for Microcystins and Cylindrospermopsin to ensure that it reflects the best available science to develop levels for these cyanotoxins below which adverse health effects are not anticipated to occur.

The EPA is also working to develop national recommended ambient water quality criteria pursuant to the Clean Water Act for the protection of human health for Microcystins, Anatoxin-a, and Cylindrospermopsin. These recommended criteria will identify levels of cyanotoxins at which adverse health effects are not anticipated to occur from drinking water or eating contaminated fish and shellfish. These levels can be used by states and tribes as they develop their water quality standards.

The EPA's website currently provides information for state and water sector professionals on the recommended treatment practices that water systems can utilize to reduce the levels of cyanotoxins in drinking water. This information will also be incorporated into the health advisory, to enable water systems and state officials to determine when steps should be taken to address elevated levels of cyanotoxins in drinking water supplies and to provide them with recommendations on effective strategies to do so.

In the aftermath of the Toledo incident, the EPA engaged with states and water sector professionals to provide information on human health effects, analytical screening tools, and the effectiveness of various treatment processes to remove or inactivate the three most important cyanotoxins that have been found broadly in drinking water sources in many parts of the U.S.: Microcystins, Anatoxin-a, and Cylindrospermopsin. In September, the EPA published guidance to provide recommended procedures for preservation, handling, and transportation of monitoring samples to ensure that challenges that were encountered during the Toledo incident are not repeated elsewhere.

Preventing HABs – Source Water Protection and Drinking Water Infrastructure

This year's incident in Toledo resulted from high levels of algal toxins in western Lake Erie and difficulties in removing those contaminants at the treatment plant. Strong source water protection programs and continued investments in the nation's drinking water infrastructure will be necessary to eliminate these sorts of events in the future.

Preventative measures are the preferred approach to managing the occurrence of cyanobacterial blooms. The most effective preventative measures are those that seek to control the anthropogenic influences that promote blooms such as the leaching and runoff of excess nutrients. Effective management practices for nutrients, specifically nitrogen and phosphorus, can reduce loadings from both point and nonpoint sources, including water treatment discharges, and runoff from urban, suburban and rural areas. These steps will be particularly important as communities face challenges with increasingly intense precipitation events that may promote the growth and persistence of HABs in the nation's source waters.

Since the Great Lakes Restoration Initiative was established in 2010, the EPA has made it a priority to fund nutrient runoff reduction in partnership with its fellow federal departments, including USDA and DOI, investing tens of millions of dollars in watersheds such as the Maumee River, Lower Fox River and Saginaw River. More recently, in response to the Toledo event, the EPA redirected $12 million in Great Lakes Restoration Initiative funding to federal and state agencies to target HABs in western Lake Erie. This funding will be used to expand monitoring and forecasting to help drinking water treatment plant operators and beach managers minimize impacts, increase incentives for farmers in western Lake Erie watersheds to reduce runoff, and improve measurements of nutrient loads in Lake Erie tributaries.

Controlling and managing cyanobacteria in surface water, and treating cyanotoxins in drinking water, is critical to protect human health. Drinking water treatment processes have been shown to be effective in removing cyanotoxins. However, these treatment techniques can generate a considerable expense for local communities which are already facing extensive infrastructure needs to meet the demand of their customers. Ensuring adequate investment in our nation's water infrastructure is necessary to ensure that drinking water treatment plants are able to effectively treat emerging contaminants and prevent events such as the one in Toledo.

An important component of preventing or minimizing cyanotoxin impacts is through early warning of CyanoHAB events. During the bloom season, NOAA monitors and predicts CyanoHABs in Lake Erie, providing weekly forecasts to water managers. This early warning allows water managers to take actions when CyanoHAB events threaten their system's source water.

Conclusion

As this summer's Toledo incident highlights, CyanoHABs have become an increasing problem that can affect communities all across the country. Toledo and the surrounding communities on western Lake Erie remain vulnerable to emergency shutdowns from CyanoHABs, and coordinated federal, state and local actions must continue to protect the nation's drinking water supplies. The EPA is taking aggressive action to develop and publish health advisories, water quality criteria, and analytical methods while providing ongoing technical assistance to states and communities. The EPA will continue to engage with utilities, and local, state, and federal

government partners, to reduce utilities' vulnerability to such incidents through preventive and preparedness measures.

Once again, Chairman Shimkus, Ranking Member Tonko, and Members of the Subcommittee, thank you for the opportunity to discuss the EPA's work on cyanotoxins and drinking water. I look forward to answering any questions you may have.

Mr. SHIMKUS. Thank you very much. First of all, I want to personally thank you for flying back, especially for today for the hearing in a town called New Orleans, so—New Orleans, D.C., 15 degrees versus whatever it was down there. We appreciate it.

Then I will recognize myself for 5 minutes for the first round of questions. Could you please—I kind of said some of this stuff in my opening statement, and you kind of reaffirmed this, just, for the record, how many cyanotoxins there are.

Mr. GREVATT. So there are many dozens of cyanotoxins. There are over 40 cyanobacteria that can produce cyanotoxins, and there are in the range of 80 forms of microcystins alone, so there are many dozens of different cyanotoxins.

Mr. SHIMKUS. And that was my next question. So there are over 80 microcystins?

Mr. GREVATT. Yes, sir.

Mr. SHIMKUS. Are all cyanobacteria harmful?

Mr. GREVATT. So cyanobacteria are capable—certainly some are capable of producing the toxins. It is the toxins that are released from the bacteria that are harmful. And we don't fully appreciate the specific conditions that lead cyanobacteria to generate these toxins, so they aren't necessarily always harmful in every condition, but certainly they are capable of producing very harmful compounds.

Mr. SHIMKUS. Do you know which cyanobacteria are harmful in a drinking water context?

Mr. GREVATT. So the ones that we have been most concerned about are microcystis, and then the cyanobacteria that also produce the anatoxin, the cylindrospermopsin, and the saxitoxin. The ones that we are focused on currently at EPA are the microcystin generated cyanobacteria, as well as cylindrospermopsins and the anatoxins.

Mr. SHIMKUS. Is there a threshold level of exposure of microcystin LR in drinking water at which the EPA has seen adverse human impacts?

Mr. GREVATT. So there is no threshold level yet that has been identified in humans. There has never been any testing in humans to identify what a threshold level might be. There certainly is the history with microcystins of—for example, in Brazil in the '90s, there was a kidney dialysis center that microcystins in their system that led to 50 deaths as a result of that treatment. So we know that microcystins can, in certain circumstances, produce high toxicity in humans. We don't know specifically what a threshold level would be.

Part of what our health advisory effort is designed to do is to help identify a level below which we think exposure would be safe.

Mr. SHIMKUS. And that Brazil case, was that over time, or was it, like, identified, and then those deaths occurred rapidly? Was that over time?

Mr. GREVATT. So I would have to get back to you on the specifics of that case. All that I know is that that clearly was defined as microcystin leading to 50 deaths. And that was, of course, intravenous exposure, and at much higher levels than what we might see——

Mr. SHIMKUS. Right.

Mr. GREVATT [continuing]. In drinking water, but it tells us, at least, this is a dangerous compound for humans.

Mr. SHIMKUS. Right. Thank you. Many people have been using the terms like health advisory and standard interchangeably, but I am not sure that they are. So are these terms defined in the Safe Drinking Water Act?

Mr. GREVATT. Yes, these terms are defined in the Safe Drinking Water Act. The health advisories were introduced in the 1996 amendments to the Act. These are non-regulatory levels, right, and they are really guidance values to help states and communities to guide their steps they might take in response to the presence of contaminants in drinking water. A standard, of course, is a regulatory value that drinking water systems must meet.

Mr. SHIMKUS. Thank you. When EPA issues a health advisory, what types of information does it address, and what level of detail?

Mr. GREVATT. Right. So there are several pieces of the health advisory that will—pieces of information that will be included. The first is discussing the environmental properties of the compound the health advisory is focused on. The second is identifying sampling and analytical techniques that are available for that compound. The third is identifying the safe level for that compound. Then the last, very important piece is identifying treatment technologies that are available to remove that compound from drinking water systems.

Mr. SHIMKUS. Yes, and that is what my follow-up was—my follow-up was do you recommend testing methods in these? And you did talk about treatment a little bit.

Mr. GREVATT. Right. So we are currently in the process of developing a new analytical method for microcystin, and cylindrospermopsin, and anatoxin. And so these methods will help us to be able to define specifically much lower levels of these toxins in drinking water. You are probably aware that many systems in states across the country currently use a screening level method known as the Elisa Method. That is certainly what was used in Toledo, and by the State of Ohio. It is a very useful method. The one we are developing is going to be very specific for individual microsystem——

Mr. SHIMKUS. Thank you very much. I yield back the remainder of my time, and turn to Ranking Member Mr. Tonko for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair. Doctor, we have heard today about actions that can be taken to address harmful algal blooms in the short and long term. Some may believe that the solution to this drinking water problem is a standard for microcystin, the toxin released by these organisms. But that would require water utilities to treat the symptom of harmful algal blooms, instead of addressing the underlying root causes. One tool for addressing these causes that cannot be overlooked is the regulation of nutrient pollution.

Excessive amounts of nitrogen and phosphorous in water sources from agricultural storm water and waste water runoff fuel rapid algal growth. Algae's rapid reproduction outpaces that of other organisms, overtaking entire ecosystems. When they die, sink to the bottom, and decompose, an oxygen-free dead zone, as you know, is the result.

So, Dr. Grevatt, how are elevated nutrient levels in water sources like Lake Erie contributing to harmful algal blooms and toxic contamination of our water sources?

Mr. GREVATT. Thank you. So we understand clearly that there are several factors that contribute to the growth of harmful algal blooms, certainly one of those is nutrients, and we believe that a solution to this problem requires attention both on source water protection, as well as infrastructure in the drinking water treatment facilities, that without both of those steps it would be very difficult to manage this problem.

Mr. TONKO. And what authority does your office have under the Safe Drinking Water Act and the Clean Water Act to prevent non-point source nutrient pollution from entering our drinking water sources?

Mr. GREVATT. Right. So, under the Safe Drinking Water Act, which my office is solely responsible for implementing, there is a requirement for states to produce source water assessments, which was completed. This was in the 1996 amendments. Every state has completed this task. There are no further requirements for source water protection, but certainly we encourage states and local communities to work together to address the sources of pollution that can create these sorts of problems in drinking water supplies.

Clean Water Act is not an authority that my office implements, but certainly there are a number of provisions focusing on issues like non-point source pollution. We have the 319 grants, and a number of other activities that we have been advancing, along with partners at the Federal level to address sources pollution.

Mr. TONKO. And, in your view, is it important to address nutrient pollution in addition to addressing the cyanotoxins in drinking water?

Mr. GREVATT. Without question. I think it would be very difficult. If we don't do that, what will happen is that we are putting all the burden on the drinking water systems to remove the toxins from the source water, and we saw in the case of Toledo that that can be a difficult thing to achieve. And so we believe it is important to address both the sources that are contributing to the growth of the algal blooms, as well as making sure that the treatment systems are up to the very tip-top shape so they can remove these pollutants from the drinking water.

Mr. TONKO. And the treatment systems are available, or do they need to be further developed?

Mr. GREVATT. So the treatment systems are—treatment techniques are available to remove algal toxins and cyanobacteria from drinking water supplies, but it is not necessarily a simple and straightforward task. And so that is part of the reason why we think we really have to address both issues——

Mr. TONKO. Yes.

Mr. GREVATT [continuing]. Currently.

Mr. TONKO. And is drinking water contamination the only problem associated with these blooms?

Mr. GREVATT. So there are a number of issues. I think not many of you are familiar with concerns associated with recreational use of water, children and families at bathing beaches, if there are harmful algal blooms, can be exposed, and, in some cases, sickened

by those blooms. Certainly we see issues with livestock and pets who have been poisoned as a result of harmful algal blooms. And as well, as you mentioned, the blooms can contribute to hypoxic situations in lakes and reservoirs, and that can create a whole other set of issues that are separate from the drinking water concerns.

Mr. TONKO. Another important tool is to ensure adequate protections for seasonal streams, wetlands, and other water with significant connections to downstream waters. The regulatory statute of these waters—the regulatory of these waters under the Clean Water Act is often misunderstood. EPA and the United States Army Corps of Engineers recently proposed to clarify the definition of waters of the United States under the Clean Water Act to eliminate confusion, and ensure that these waters are protected.

The recent report that I cited earlier included a recommendation to restore wetland areas, and increase them by 10 percent, and the Western Lake Erie Basin is one of the ways to address algal blooms in the lake. What is the function of these small streams, wetlands, and other water bodies, and why are they important to our ecosystem?

Mr. GREVATT. Right. Thank you. So, I want to be clear, again, that my office doesn't implement the Clean Water Act, but certainly it is the case that it is very difficult to protect a body of water like Lake Erie without addressing the pollutants that are flowing into the water from other streams and rivers, and so I think it is a very important issue to think about comprehensively.

Mr. TONKO. Thank you. With that, I yield back, Mr. Chair.

Mr. SHIMKUS. Gentleman yields back his time. Chair now recognizes the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. LATTA. Well, thank you very much, Mr. Chairman, I really appreciate it. And Director, thank you again for being here. And, again, as the Chairman said, thanks very much for coming back from New Orleans to be with us today at the subcommittee hearing, because it is very important to our region of the state, but also what is going to come out of your office in the near future is important to everyone.

And as we look at how obviously important it is that we understand the extent of the problem that we have, and I know I really appreciated the opportunity to sit down with you earlier this fall to go through what had happened, and also some of the issues that you are facing on peer review in getting that information together, what do you believe today are the largest gaps that we have in the health effects on the cyanotoxins are, and those gaps?

Mr. GREVATT. Right, thank you. So there are a number of different cyanotoxins, as I mentioned. There are some that we understand much better than others. Perhaps the best studied is the microcystin cyanotoxin that was the issue within the City of Toledo drinking water system. And that is one of the health advisories that we will be developing, along with cylindrospermopsin.

Probably the largest data gaps we have, in terms of toxicity, is the effects at very low levels of exposure. So there are a number of studies that have been generated in animals that look at issues like liver toxicity, and reproductive toxicity associated with microcystin exposure, but those studies aren't perfect. We had been, as I mentioned, generating a health advisory for microcystin,

and we have subjected that draft health advisory to two rounds of independent external peer review, and we are using the feedback from the peer reviewers to make sure that we are taking the best approaches to incorporate the information from these studies, and the health advisory. And we will have that health advisory available in the spring of next year.

Mr. LATTA. When you are talking about the—on a peer review, and maybe—as we talked earlier. Could you go into just a little bit about—it is kind of difficult because of the technical nature of this, and the expertise that is required, and the folks that you have to find to be able to conduct this peer review?

Mr. GREVATT. That is right. So what we will typically do at EPA—when I say independent external, what I mean by that is we will hire a contractor to identify scientists who are not connected with the agency to review our work and give us feedback independent of us. We don't choose the scientists who review our work. They give us the feedback, and then we look at how we interpret and incorporate their advice on how we finalize these health advisories.

But we are looking at studies, typically in animals, and we have to try and understand what those studies tell us about the potential risks for humans. And that is part of the reason why it is so important to have the peer review, to have the advice about how best to do that.

Mr. LATTA. OK. And as we know, that Ohio, and some of the other states, if I am not mistaken from our conversation, only about six other states are out there that are using surface water, or have some type of a standard in place, and we are using the World Health Organization standard. And when you are looking at your health advisory that you are working on for next year releasing, when was it that you all first decided at EPA that you needed to really have that standard in place?

Mr. GREVATT. We decided that we needed to put a health advisory in place well before the Toledo incident, so we have been working on this throughout the last year, and even before. And we are working closely with Health Canada and a number of states in this effort to make sure that we are using the best available data in the best way.

Mr. LATTA. And when you are talking about that is—in the last year, when you started looking at that, was there a reason that you hadn't started working on it sooner, or is it something that has just been coming up? Or what was the reasoning behind that?

Mr. GREVATT. Right. It is an excellent question, and there are two issues that have been challenging related to cyanotoxins. One has been the absence of analytical methods that are specific for individual cyanotoxins. And you remember I mentioned there are over 80 conjurers of microcystin that have different levels of toxicity. And the second is that the data set on toxicity has not been all that robust.

There have been some additional studies that have been generated, and, in fact, the World Health Organization value, which about 12 countries around the world use today, and a number of states use, that is based on a 1999 study, and it is a 2003 guidance value that was generated, and so we felt it was important to up-

date that science. I think we have heard from you, and many of your colleagues, about how important it is to have a Federal health advisory in place, rather than relying on something from the World Health Organization.

Mr. LATTA. And in my remaining time, would that also include—an advisory, would EPA issue for other separate types of algal—or not algal blooms, but algal toxins? Would there be one, or would you have several different types of advisories that you would have out there?

Mr. GREVATT. We will have two health advisories, one for microcystin, and a second for cylindrospermopsin. Those are the two that we are focused on right now. So there will be two documents that will come out. They will both include information on health effects, treatment technologies, and analytical procedures for sampling these compounds.

Mr. LATTA. OK. Well, thank you very much, and, again, thank you very much for being here. And, Mr. Chairman, I yield back the balance of my time.

Mr. SHIMKUS. Gentleman's time has expired. Chair now recognizes the gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman, and thank you for—Congressman Latta for bringing this to our attention. I don't think 5 minutes is going to be enough for me, but let me see where we can go with this.

Why Lake Erie? Is this—what made it unique? Because the same toxins, or same nutrients are coming into the water in Superior and Lake Michigan. Why—the—and is—am I accurate—I was told that the—they—they are doing dredging near the port in Toledo. So I didn't hear that come up as a possibility of something that could be contributing, because you would have nutrients absorbed into the sediment that would be disturbed. Do you consider that possibly part of the uniqueness of why western Erie was a factor?

Mr. GREVATT. Thank you. So clearly there are a number of issues that contribute to the growth of harmful algal blooms. We understand that nutrients are a very important factor. We also understand that the warmth of the water is an important factor. Availability of light is an important factor. And these issues come together in western Lake Erie, being a very shallow area, one of the most shallow areas of the Great Lakes, that has large nutrient inflows, as well as having very warm water temperatures. And also relatively stable water, without a whole lot of flows, can also contribute. And so that is—all those factors are present within western Lake Erie.

We should be clear that there are many, many lakes and reservoirs across the United States that are being impacted by harmful algal blooms today, and many states across the U.S. that have similar factors of nutrient in——

Mr. MCKINLEY. But what about——

Mr. GREVATT [continuing]. Shallow water.

Mr. MCKINLEY [continuing]. The dredging? Could that be—how do you take that into consideration?

Mr. MCKINLEY. Thank you. So certainly there are a lot of nutrients in the Lake Erie system today. Some of those are contained

within the dredge spoils, and there are some who believe that the dredging may be a contributing factor, if they are releasing nutrients into the water column, and also supporting, then, the growth of the algae.

Mr. MCKINLEY. What about the zebra mussel that was introduced? I understand that also potentially has a contributing factor.

Mr. GREVATT. That is an excellent question, and a number of my colleagues within the Great Lakes states are focused on issues, including invasive species. The thinking that some have shared is that zebra mussels may contribute to the growth of harmful algal blooms, cyanobacteria, by essentially competitively eliminating the native species of algae, and giving the cyanobacteria a greater opportunity to use the nutrients that are available to grow and create blooms.

Mr. MCKINLEY. All right. So—and then go back down to the fundamental, it sounds like we are reacting, rather than anticipatory. How are they testing for this? Is there just—under the normal water treatment, does it remove the bacteria, and something showed up on a test that was unique that—after the fact that we had been using this water for some time? How does our conventional treatment take care of this problem?

Mr. GREVATT. Our conventional treatment technologies can take care of the problem, but it is not a simple task to do, you know, so there are issues. For example, the microsystems, the toxins, are frequently found within the cells, the cyanobacteria cells. If one inadvertently breaks open the cells in the treatment technology, they can actually make the problem worse. So it is not a simple task to remove the cyanotoxins from drinking water with standard treatment techniques.

Harmful algal blooms are not a new problem. They are a problem that was present even decades ago, when I was growing up in Cleveland, on Lake Erie. There were issues with harmful algal blooms on the lake at that time, in the 1960s. We made progress, and we see them now coming back for reasons that we may not fully understand, all the different factors that are contributing to that.

One of the activities that we put in place at EPA over the last several years was a national lakes assessment that characterized the conditions of the nation's lakes and reservoirs, and that assessment sampled for cyanobacteria and for microcystin, and helped to identify the extent of the problem across the U.S., and I think contributed, in some ways, to the awareness of some states, like the State of Ohio and others, to the issues that need to be addressed.

Mr. MCKINLEY. OK, but that just—there are a lot of communities—I don't want to look at the Toledos, and the Clevelands, and the Bostons, and—but what about the small communities, or rural America? How do—are they going to be equipped to be able to do the same water testing that Cleveland does, or St. Louis?

Mr. GREVATT. This is a a very important issue, and you may be aware that, not in 2014, but in 2013 Carroll Township, a community of 4,000 on western Lake Erie, shut down for several days as a result of algal toxins within their system. Carroll Township was able to hook up to a neighboring community to get pure water provided to their customers, but that may not always be the case. And

you are right that that is going to be a significant challenge for small communities.

Within our program, our State Drinking Water Revolving Loan Fund is focused on providing resources especially to small communities. So we provide resources to small, medium, and large communities, but especially focused on small communities to help them address these sorts of issues.

Mr. MCKINLEY. OK. I have run over my time. Thank you very much.

Mr. SHIMKUS. Thank you, and I also want to highlight this. You work with the State Revolving Loan Fund. I have got a large rural area, and that has been a very successful program. It has been very helpful to my community, so—seeing—is there any other questions from colleagues present? Seeing none, again, we want to thank you for making your trip back. This is an important issue. We want to keep our eye on it, and work with everything, and stakeholders, to try to make sure that we can do what is in the best interest to protect the water supply for our constituents and our citizens. So thank you very much, and with that, I will dismiss the first panel, and we will empanel the second one.

And we want to welcome, as the second panel—in the order at the table, we have the Honorable Craig Butler, who is director of Ohio Environmental Protection Agency. We have Mr. John Donahue, general manager at North Park Illinois Public Water District, on behalf of the American Water Works Association. And last, but not least, Ms. Lynn Thorp, national campaigns director of the Clean Water Action. Welcome.

Your full statements will be submitted for the record. You will have 5 minutes. It is a—as you see, it is kind of a laid back day, so we are not going to be, again, brutal on time, but if we can get to questions eventually, that would be great. And I also want to thank—Mr. Grevatt is still sitting here, which I think is very important, and thank you for attending for a little bit longer.

So with that, Mr. Butler, you are recognized for 5 minutes.

STATEMENTS OF THE HONORABLE CRAIG W. BUTLER, DIRECTOR, OHIO ENVIRONMENTAL PROTECTION AGENCY; JOHN DONAHUE, GENERAL MANAGER, NORTH PARK (IL) PUBLIC WATER DISTRICT, ON BEHALF OF AMERICAN WATER WORKS ASSOCIATION; AND LYNN THORP, NATIONAL CAMPAIGNS DIRECTOR, CLEAN WATER ACTION

STATEMENT OF CRAIG W. BUTLER

Mr. BUTLER. Good morning, Mr. Chairman, Ranking Member Tonko, rest of the members of the committee, Representative Latta also for the invitation today. We appreciate it. I am Craig Butler, Director of Ohio EPA, and the Environmental Protection Agency, we appreciate the opportunity to offer testimony on the important subject of cyanotoxins, or harmful algal blooms, or sometimes we call them HABs, in our drinking water. The importance of this hearing, as we have heard today, cannot be highlighted more by the events of early August in Toledo, when nearly 500,000 people were told not to drink the water due to presence of microcystin in public drinking water above an acceptable level. Recommending

the issuance of this was not taken lightly, given the significance of the social and economic impact. But in consultation with experts on my staff, a decision had to be made to protect public health, and was based on the best science available.

Ensuring that Ohio's 4,500 public water systems provide safe drinking water is one of the most important responsibilities I have as director at Ohio EPA. This includes 125 systems using surface water, several of which draw their water directly from Lake Erie. To do this, Ohio implements and enforces drinking water standards and regulations established by U.S. EPA. I believe U.S. EPA's general regulatory approach is very robust, results in scientifically defensible and feasible regulation.

In dealing with HABs in Ohio drinking water supplies, we had to short circuit this rigorous regulatory process out of necessity. For example, in 2010, largely responsible to a significant harmful algal bloom in Grand Lake St. Mary's in Western Central Ohio, the state established a strategy to identify and respond to the presence of toxins in water being used for recreation, and as a source of public drinking water. Ohio has established sampling and analytical protocols, and also public health advisory levels, for several of the most commonly identified toxins. And while we worked with U.S. EPA on many of these issues, Ohio realized we would need to lead the nation in many respects, and have to go it alone, if you will, since a national regulatory testing framework was not completed at that time.

With the technical assistance of U.S. EPA since, and the Office of Water, and the Office of Research and Development, which is located in Ohio, we are pleased, and have been able to work with Toledo to ensure that their treatment plant was again operating properly, and able to provide Toledoans with safe drinking water.

One of our lessons learned, if you will, and one of the very first of many steps we took to combat harmful algal blooms after the event in Toledo was to immediately make $1 million available in grant funds for cyanobacteria testing equipment to communities so water systems across the state could, and can, conduct their own monitoring for the presence of HABs. We believe this will enable them to more closely monitor the source water for algal blooms, and rapidly respond with any necessary treatment and adjustments.

We also made $50 million available through zero interest loans for enhanced water treatment and infrastructure, and backup water sources at public water systems. And while not directly related to drinking water, we also, at that time, made $100 million available to our wastewater treatment systems across the state to help manage the issues about nutrients being discharged from their waste treatment systems.

Ohio EPA continues to coordinate with U.S. EPA regarding the health advisory we spoke of—heard Dr. Grevatt speak of this morning about levels expected to be issues—issued by the U.S. EPA next spring, as well as the analytical methodologies, and the effectiveness of various treatment processes. We know they have accelerated this work, and we applaud their efforts to provide more guidance to states. We have also been coordinating with other states through the Association of State Drinking Water Administrators,

and concur with the comments contained in ASDWA's November 14, 2014 letter to this subcommittee.

Ohio EPA has been active in addressing HAB and drinking water sources, but as I can tell you, these issues are very complex. Many other states are under similar circumstances, although only about six have identified health advisory levels. Those levels are different, and based on a small set of data and information about HABs. It is my belief that the country would benefit from having a national dialogue, and establishing a consistent set of national standards for all to follow.

Specific elements of the national approach should include a robust assessment of the health effects, and recommended health advisory levels not only for microcystin, but also for other variants of microcystin, as well as other common cyanotoxins. Second, standard analytical methods that are reliable and selective, but also affordable, guidance on the appropriate frequency of monitoring. Additional information on the ecology of cyanobacteria, and more guidance on the reliable treatment approach are necessary.

In the long term, however, we believe that the best approach is to protect public water supplies through a source water protection plan, as well as preventing blooms via data driven targeted strategies to address nutrient pollution from not only agriculture, but other point sources, non-point sources, and other sources in general. As we are putting—and we are putting that into place in Ohio today. With the support of significant funding through the GLRI, or the Great Lakes Restoration Initiative, we have developed a coordinated strategy with the State's Department of Agriculture, Natural Resources, EPA, and Health to develop prescriptions for watersheds in the Lake Erie Basin to address nutrient pollution, based on data we have available.

In summary, EPA takes very seriously the quality of water—drinking water supplied to our public water systems. Ohio has taken many proactive steps to address the issue. It is our strong belief that state and Federal leaders need to work closely together to quickly advance the science of detection and effective treatment. We stand ready in the State of Ohio to continue to lead in this effort, and we will gladly work with other states. I appreciate the opportunity to offer this testimony to the committee, and would be pleased to respond and answer any questions.

[The prepared statement of Mr. Butler follows:]

Testimony of
Craig Butler, Director
Ohio Environmental Protection Agency

House Energy and Commerce Committee
Subcommittee on Energy and the Environment
Cyanotoxins in Drinking Water
November 19, 2014

Who Are We?

The Ohio Environmental Protection Agency has received primary enforcement authority from the United States Environmental Protection Agency (U.S. EPA) to implement the Safe Drinking Water Act (SDWA) within Ohio. We implement a "source to tap" program to ensure public water systems are in compliance with drinking water requirements. Ohio EPA regulates over 4,500 public water systems, including 114 that use surface water as a source. Twenty-five public water systems in Ohio use Lake Erie as their source water, serving a combined population of over 2.6 million people. Traditionally, Ohio implements and enforces drinking water standards and regulations that are established by U.S. EPA.

How did we get to where we are?

U.S. EPA's general regulatory approach is very robust and results in scientifically defensible regulations. Ohio has been forced to "short-circuit" this rigorous regulatory process out of necessity in the current circumstances where Harmful Algal Blooms (HABs) threaten the source waters used by public water systems.

To fill this gap, beginning in 2010 Ohio began issuing recreational advisories for bodies of water, including Grand Lake St. Marys, that also were being used as a source of public drinking water. Ohio EPA anticipated that people would logically ask "If I can't swim in it, is it safe to drink?" In an effort to answer these questions and reassure the public water systems' consumers, we determined it was important to test the treated drinking water for the most common cyanotoxins. We also knew that it was critical to understand how we would use the test results once we had them. Ohio formed an interagency state workgroup with representatives from Ohio EPA, the Ohio Department of Health and the Ohio Department of Natural Resources to develop a HAB Response Strategy that dealt with both recreational and public drinking water issues. The workgroup benchmarked off other states and countries to develop a strategy that established sampling and analytical protocols as well as public health advisory levels for several of the most commonly identified toxins. Based on the research available at the time, Ohio EPA generally expected that testing of the treated drinking water would show that treatment was effective. The triggered advisory was included as a contingency, in case the data showed otherwise.

The majority of sampling has proven the effectiveness of treatment, as expected. Since sampling for cyanotoxins began in 2010, Ohio EPA has collected over 1,500 raw and treated water cyanotoxin samples at almost 50 public water systems. Public water systems that have recurring

HABs in their source water are encouraged to collect their own samples and have submitted hundreds of additional sample results to Ohio EPA. While cyanotoxins have been detected in the majority of the source waters sampled in Ohio, there were no detections above the drinking water thresholds until microcystin was detected above Ohio thresholds in the treated water for Carroll Township in September 2013 and for the City of Toledo in August 2014. In accordance with the State of Ohio HAB Strategy, these threshold exceedances resulted in the issuance of "Do Not Drink" Advisories.

What is Ohio doing to address cyanotoxins in public drinking water sources?

Ohio is working on many different fronts to respond to these issues. Our first of many steps to help combat HABs in Ohio after the events in Toledo was to immediately make $1 million in grant funds available for cyanotoxin testing equipment so water systems can conduct their own monitoring, to be disbursed in up to $10,000 increments per water system. This will enable them to more closely monitor the source water for algal blooms, which are very dynamic, and more rapidly respond with any necessary treatment adjustments. Ohio EPA also made $50 million available as zero-interest loans for enhanced water treatment infrastructure and back-up water sources at public water systems.

Ohio EPA also has been coordinating with U.S. EPA regarding the health advisory levels expected to be issued by U.S. EPA, and we plan to update the State of Ohio HAB Strategy when they are finalized. We have been working with U.S. EPA on analytical methodologies and the effectiveness of various treatment processes. Ohio EPA also has been coordinating with the Association of State Drinking Water Administrators (ASDWA), and we concur with the comments and recommendations contained in its letter dated November 14, 2014, to this Subcommittee.

Ohio EPA issued and is developing revisions to a standard operating procedure for the most commonly used testing method (ELISA), so that the results are as consistent and comparable as possible. We also are coordinating with the kit manufacturer to investigate matrix interferences that may cause issues with the analytical tests. Additionally, we have been working with the Battelle Memorial Institute to establish a program to verify other available test kits.

We are coordinating with the Ohio Section of the American Water Works Association to update the white paper on treatment technologies. We have coordinated with the Ohio State University to establish a new reservoir management training course and to offer additional algal identification courses for public water system operators. We've also been working with public water systems, including participating in emergency planning exercises.

Ohio also has developed a coordinated strategy with the Departments of Agriculture, Natural Resources, EPA and Health to develop prescriptions for the watersheds in the Lake Erie basin to address nutrient pollution.

Request for federal guidance

Ohio EPA has been active in addressing HABs in drinking water sources, but these issues are very complex and we have repeatedly and will continue to request federal assistance and guidance. There are many other states in similar circumstances, although only a limited number of states have identified health advisory levels and many of them are different. It is our belief that the country would benefit from a consistent national approach to these issues. Specific elements to a national approach should include:

- **Health effects:** A robust assessment is needed on the health effects and recommended health advisory levels, not only for microcystin-LR (as expected), but also for other variants of microcystin as well as other common cyanotoxins. This assessment should take into account various exposures (especially acute and short-term) and sensitive subpopulations, as well as the cumulative effects of multiple cyanotoxins/variants. Federal guidance is requested for how and when any health advisory level should be applied. For example, if microcystin-LR is the only variant of microcystin for which a federal health advisory level is issued, how should states respond if other variants are detected above the LR threshold?

- **Detection:** Standard analytical methods are needed that are reliable and selective, but also affordable, available and easy to use. Analytical reference standards that are consistent and reliable are needed, as well as information on common matrix interferences and a method for evaluating and verifying the performance of the various test kits available. Guidance on the appropriate frequency of monitoring, considering the dynamic nature of the blooms, is also requested.

  Finally, satellite imagery has been an important tool in the surveillance and monitoring of HABs in Lake Erie. This tool was previously also available for inland lakes but due to satellite losses has been unavailable for several years now. It is our understanding the satellite is expected to be replaced soon, but an expedited schedule to return this important detection tool to use is requested, if possible.

- **Additional ecological research:** Additional information is needed on the ecology of cyanobacteria, including what triggers them to produce cyanotoxins and why the toxins are sometimes more extracellular than intracellular and how treatment strategies may vary. In addition, more information about diurnal bloom dynamics may enable some water systems to employ avoidance strategies.

- **Treatment:** More guidance is needed on effective and reliable treatment approaches, including how to optimize current available treatment, best advanced treatment options, and management of treatment residuals. Guidance on effective reservoir management strategies would be helpful for many public water systems.

Prevention: Early detection of cyanotoxins in the source and treated water are necessary, but it won't necessarily prevent an advisory. Treatment of the source water is necessary but can become quite expensive if the source water quality is poor. The best approach in the long-term is

to work to implement source water protection activities as well as prevent blooms and bring these ecosystems back into balance via data-driven, targeted strategies to address nutrient pollution. Ohio EPA would support changes to Section 1452(k)(1)(C) of the Safe Drinking Water Act to make funds available again to complete assessments of waters being used as a source of drinking water.

Summary

Ohio EPA takes very seriously the quality of drinking water supplied by public water systems. HABs have proven to be a very dynamic and variable source of potential contamination, and for which many scientific uncertainties still remain. Ohio has taken many steps to proactively address the issue of cyanotoxins in drinking water, but this is a complex and challenging issue and much remains to be done. State and federal leaders need to work closely together to quickly advance the science to detect and effectively treat cyanotoxins in drinking water, and to adjust our strategies as new information is obtained.

I appreciate the opportunity to offer this testimony to the committee and would be pleased to respond to any questions the Committee may have during my oral testimony.

Ohio Department of Agriculture

OhioEPA

Nutrient Management Initiatives in Ohio

Ohio is aggressively tackling issues of water quality, particularly harmful algal blooms (HABs). A multi-faceted, multi-year approach to reduce the discharges and runoff of nutrients is vital to protect public health, the environment and our valuable water resources. Ohio's approach uses both broad and targeted projects and partnerships on the local, state, national and international levels. Some of these are highlighted below.

On-the-Ground Practices

- The Ohio Department of Natural Resources (ODNR), Ohio Department of Agriculture (ODA) and Ohio Environmental Protection Agency (Ohio EPA) have worked collaboratively to improve the health of **Grand Lake St. Marys** and its watershed. With the assistance of numerous local, state and federal partners, Ohio has implemented multiple practices including: increased dredging to improve boater safety and water quality; rough fish removal; constructed wetland and treatment train installation; improved aeration efforts; alum treatments and the installation of more than 700 conservation practices in the watershed.
- Through the **Ohio Clean Lakes Initiative**, the Ohio Legislature -- led by State Sen. Randy Gardner -- appropriated more than $3.55 million for the installation of best management practices (BMPs) to reduce nutrient runoff in the Western Lake Erie Basin. State and local partners worked with more than 350 farmers to implement BMPs on more than 40,000 acres. Additional stream monitoring stations have also been installed to measure the effectiveness of these practices.
- The Ohio Legislature appropriated $10 million to the **Healthy Lake Erie Initiative** to be used to reduce the open lake placement of dredge material into Lake Erie. The funds will identify or develop alternate uses for this material and identify additional disposal locations.
- Ohio EPA used funds from the **Great Lakes Restoration Initiative** to award grants to local and state organizations for projects to protect or improve Lake Erie water quality, including storm water projects, home septic system replacement/improvements and stream restoration projects.
- The Ohio Natural Resources Conservation Service is part of the **National Water Quality Initiative**, an effort to improve conservation practice delivery. Ohio EPA is assisting in this effort to help farmers implement conservation systems.

Strategies, Research, Partnerships and Legislative Updates

- In 2011, the directors of Ohio EPA, ODNR and ODA called together the **Directors' Agricultural Nutrients and Water Quality Working Group** of research scientists, agribusiness leaders and environmentalists to discuss how agricultural practices may affect conditions in Lake Erie and develop recommendations on how the state can partner with the agricultural community to promote nutrient stewardship statewide. The agencies also reconvened the **Ohio Lake Erie Phosphorus Task Force**. The group issued a new report that further analyzed the latest research on how nutrients are entering our water systems and made recommendations for both private sector and public policy initiatives to reduce the amount of nutrient loading in Lake Erie.
- Ohio EPA, coordinating with ODA and ODNR, developed **Ohio's Nutrient Reduction Strategy**, a comprehensive plan to manage point and non-point sources of nutrients and reduce their impact on Ohio's surface waters. The strategy recommends regulatory initiatives and voluntary practices that can reduce nutrients throughout the state. The agencies are also working to implement the Great Lakes Water Quality Agreement, a binational effort to develop phosphorus targets and allocations for the near shore and open waters of Lake Erie by 2016 and domestic action plans for achieving those targets by 2018.
- Ohio EPA is developing Nutrient **Water Quality Standards** targeting phosphorus and nitrogen in response to U.S. EPA's national nutrient criteria recommendations and the Clean Water Act. In 2013, Ohio EPA asked for public comments from various stakeholder groups. A nutrient technical advisory group will advise Ohio EPA as it moves forward with the next steps in developing nutrient standards.

Nutrient Management Initiatives in Ohio

- In 2014, Governor John Kasich signed into law **Senate Bill 150**, an update of Ohio's regulatory structure specifically geared to improving water quality. The bill requires fertilizer applicators to undergo education and certification by ODA; encourages producers to adopt nutrient management plans; allows ODA to better track the sales and distribution of fertilizer throughout the state; and provides ODNR the authority to repurpose existing funding for additional BMP installation.
- Ohio EPA works with local communities to develop, implement and fund long-term control plans to reduce overflows of nutrient-rich sewage into streams and lakes following heavy storms and snow melt. Since 2010, Ohio EPA has awarded more than $292 million in low-interest and interest-free loans from the Water Pollution Control Loan Fund for 138 projects in the Western Lake Erie watershed.

Monitoring

- Ohio EPA's **water quality monitoring programs** are nationally recognized and essential to the state's nutrient management efforts. Ohio EPA staff annually surveys several watersheds across the state for water and sediment chemistry, biological health, diversity and habitat. These monitoring and sampling efforts include the inland lakes and Lake Erie near shore monitoring programs. Ohio EPA has formed partnerships with universities and other organizations to create a Lake Erie-specific monitoring network.
- Ohio EPA, ODNR and the Ohio Department of Health developed protocol for **monitoring public waters** where HABs exist or are suspected. Ohio is one of the first states to establish protocols for issuing advisories when algal toxins are present at or above threshold levels. For more information, go to ***ohioalgaeinfo.com***.
- Ohio EPA developed a **Public Water System Harmful Algal Bloom Response Strategy** to assist the agency and Ohio's public water systems prepare for and react to HABs in public water system source waters.
- Ohio EPA partnered with the National Oceanic and Atmospheric Administration (NOAA) to be the first state to use **NOAA satellite data** to remotely detect HABs on inland lakes and Lake Erie. This helped focus sampling efforts on areas where HABs had not been previously reported.

For More Information

- Ohio's Nutrient Strategy and Nutrient Water Quality Standards — ***epa.ohio.gov/dsw/wqs/NutrientReduction.aspx***
- Ohio Clean Lakes Initiative — ***cleanlakes.ohiodnr.gov***
- Directors' Agricultural Nutrients and Water Quality Working Group — ***http://agri.ohio.gov/topnews/waterquality/***
- Point Source and Urban Runoff Nutrient Workgroup — ***epa.ohio.gov/portals/35/documents/point_source_workgroup_report.pdf***
- Water Quality Trading Program — ***epa.ohio.gov/dsw/WQ_trading/index.aspx***
- Great Lakes Restoration Initiative — ***greatlakesrestoration.us***
- Public water systems — ***epa.ohio.gov/ddagw/HAB.aspx***

OhioEPA

FACT SHEET

Division of Drinking and Ground Waters
Division of Surface Water
Division of Environmental and Financial Assistance
August 2014

Financial Incentives to Address Harmful Algal Blooms

Lake Erie is one of Ohio's crown jewels in terms of economic impact, natural resource value and water supply. Lake Erie is a source of drinking water for 23 Ohio public water systems serving approximately 2.6 million customers. Unfortunately, recreational and drinking water uses have been impaired by harmful algal blooms (HABs) in recent years. Ohio EPA is making funds available to enhance drinking water testing and treatment, as well as reduce nutrient levels in wastewater treatment plant discharges.

Harmful Algal Blooms

A variety of nutrient sources contribute to the formation of blue-green algae, which is naturally found in Ohio lakes, ponds and slow-moving streams. Approximately 80 species of blue-green algae can produce the contaminant known as microcystin. The World Health Organization has determined that microcystin in excess of one part per billion is considered unsafe for drinking water, and Ohio EPA advises local water authorities to follow that standard.

Health effects from exposure could include numbness and dizziness, nausea, vomiting, abnormal liver function, skin irritation or rashes. In early August 2014, the City of Toledo advised residents not to use the water for more than two days due to elevated levels of microcystin in the treated drinking water.

Testing and Analysis at Public Water Systems

Based on recent events in Toledo, it is clear that Ohio public water systems need a quick and cost-effective means to test their source and finished water for the presence of cyanotoxins (microcystin, cylindrospermopsin, saxitoxin). Having the capacity to analyze samples at the public water system rather than sending samples to an outside lab will allow flexibility in monitoring and a quicker response to any potential finished water detections. Given the dynamic and unpredictable nature of cyanobacteria blooms, having this flexibility is critical.

Ohio EPA will make available $1 million in grants to Ohio public water systems to obtain the laboratory equipment, supplies and training needed to test for Microcystin and other Cyanotoxins. Only public water systems that use a surface water source are eligible for the funding, up to $10,000 per system. Funds are available immediately.

Consistent Drinking Water Testing Protocol

Ohio EPA also provided guidance to public water systems on a consistent sampling and analysis protocol for microcystins and will be available to provide additional training. Water systems doing their own sampling will follow the procedures outlined in Ohio EPA's HAB Response Strategy for public water systems. If a public water system chooses not to purchase a test kit and has a bloom of concern in its water source, Ohio EPA will conduct the sampling on a prioritized basis as described in the HAB Response Strategy.

Public Water System Infrastructure Improvements

In addition, Ohio EPA will make available $50 million at 0% interest for enhanced water treatment infrastructure components as well as back-up water sources. These funds will be administered through Ohio EPA's Water Supply Revolving Loan Account (WSRLA). The targeted entities are also public water systems that use surface water as a direct source. Priority will be given to water systems in the Lake Erie watershed, and those that have already experienced an algal bloom or a detection of toxins.

Financial Incentives to Address Harmful Algal Blooms

Qualifying projects will include components at water treatment facilities that treat for toxins produced from harmful algal blooms, as well as projects that implement avoidance strategies such as interconnections with other water supplies, new elevated storage facilities and the installation of alternative sources for source water. The 0% interest rate will be available for the portion of the project directly attributable to the treatment or avoidance strategy. Standard, below-market interest rate loan funds will be offered for the balance of a proposed project.

A call for project nominations will occur in the near future and water systems could receive assistance as early as this fall.

Nutrient Reduction from Wastewater Treatment Plants

Ohio EPA will make available $100 million at a 0% interest rate for equipment and facilities that reduce the levels of phosphorus and other pollutants. Priority will be given to public wastewater treatment plants in the Lake Erie watershed or a watershed where Ohio EPA has identified that phosphorus is excessive.

The 0% rate will be available for the portion of the project directly attributable to the nutrient reduction. Standard, below-market interest rate loan funds will be offered for the balance of a proposed project. Priority will be given to public wastewater treatment systems in the Lake Erie watershed or a watershed where Ohio EPA has identified that phosphorus is excessive. Project nominations are currently being accepted through Sept. 5, 2014.

For More Information

More information about these funding options and microcystin sampling at public water systems is available at www.epa.ohio.gov/HAB_funding.aspx

Why are we applying the WHO value as an acute health advisory?

While Ohio EPA used the WHO number in establishing our public notice advisory threshold, we also considered additional factors

- There have been additional studies beyond those used by the WHO including work by USEPA that indicated a lower reference dose may be warranted. Some of the newer data address impacts that were not considered in the WHO assessment, and some of these impacts may be more sensitive than those addressed by WHO.

- The WHO advisory value did not explicitly consider risk to sensitive subpopulations including children and bottle-fed infants or individuals with pre-existing liver damage.

As a regulator I am left to use the best science available to judge risk and develop protective policies. By using the WHO study and other emerging science available today, I believe Ohio has set a standard that is conservative, safe, responsible and protective.

What lessons learned/do we have on the analytical protocol?

Early in the crisis that occurred in Toledo, there were some questions raised on conflicting sample results. Specifically, why analytical results of finished water samples that were lysed (microcystin broken open to release toxins), showed lower results than those samples that were not lysed? This result is counter intuitive since if there were any organisms present in the water to be lysed, you would anticipate higher toxin levels. Early in the crisis some questioned if chlorine interference was causing higher values – false positives. Analytical work completed in conjunction with USEPA comparing lysed and un-lysed samples revealed that the critical factor is whether the finished water samples are immediately quenched to inactivate the chorine residual in the sample. Chlorine will degrade the microcystin and lower results over time. Additional work with the manufacturer of the testing equipment and other laboratories since that time has confirmed chlorine does not cause interferences (false positive in the analyses).

Ohio EPA, in consultation with the same team of experts, has revised and recently issued a draft final SOP for comments based on additional lessons learned this summer.

How would states want to engage with U.S. EPA in developing an advisory number and analytical method?

It is our understanding EPA is anticipated to have a reference dose number yet this year. The challenge is then to translate the Rfd to an actual number. There are a number of assumptions and uncertainty factors will be used in establishing an advisory level as well as policy considerations (e.g. tiered standard for sensitive populations verses healthy adult, acute verses multi-day exposure, single congener or consideration of equivalent cyanotoxins in water). States need to be engaged in those deliberations before the advisory number is finalized.

We believe more work is needed to evaluate the capabilities and applicability of analytical methods. Each method has its benefits and limitations. We are concerned that EPA is narrowly focused on evaluating one very expensive analytical method for only one congener of one toxin. Ohio plans to work with a commercial lab and other researchers to better to do some limited comparative studies. We will keep EPA informed as that work continues and welcome their participation.

Do we support microcystin being added to the UCMR (unregulated contaminant monitoring rule)?

Yes, we support microcystin and other cyanotoxins being added to the UCMR4.

We are concerned about focusing solely on microcystin LR when there are many more known cyanotoxins believed to also have significant health implications.

We would like to see addition analytical methods evaluated for that rule other than just LC/MS/MS.

If U.S. EPA doesn't issue an MCL, how comfortable are we about implementing their health advisory recommendations?

We understand and support the rigorous process needed to develop an MCL, but we also have an immediate need for a consistent national approach based on the best currently available science. We hope EPA moves expeditiously in working with states to finalize health advisory levels.

We anticipate, unless EPA issues something completely unexpected, that we will incorporate the advisory levels issued by USEPA into our State HAB strategy. Again, it is important that we understand all of the assumptions and uncertainty factors built into the numbers.

Are we making any changes on nutrient management?

Yes, I believe the best long term approach is protecting the source of our drinking waters and prevent blooms by bringing these ecosystems back into balance via data-driven, targeted strategies to address nutrient pollution. Ohio with support of funds provided through the Great Lakes Restoration Initiative, has developed a coordinated strategy with the Departments of Agriculture, Natural Resources, EPA and health to develop prescriptions for the watersheds in the Lake Erie basin to address nutrient pollution.

Do we want to see any changes made to the Safe Drinking Water Act?

We think it would be beneficial to change SDWA Section 1452(k)(1)(C) to allow states to again take set-asides from the SRF capitalization grants to fund source water assessments. Most assessments were completed nearly 15 years ago.

Do we need more money to help communities upgrade drinking water/wastewater treatment plant?

The answer to this question is best exemplified by the demand we had for the significant amount of funds we made available this fall for infrastructure improvements. In a matter of weeks we had request to fund projects in excess of the $150 million we were offering. Yes, we need more money for infrastructure improvements.

We would also like to see more funding available for source water assessment and protection activities as provided through SRF capitalization grant set-asides.

One possibility would be to modify SDWA Section 1452(k)(1)(C) to allow states to use this set-aside again for source water assessments. This set-aside was made available only for the 1996 and 1997 capitalization grants. Assessments completed using those funds are getting old.

Mr. SHIMKUS. Thank you very much. I would like to recognize Mr. John Donahue. Sir, again, you are recognized for 5 minutes.

STATEMENT OF JOHN DONAHUE

Mr. DONAHUE. Good morning Chairman Shimkus and members of the subcommittee. My name is John Donahue, and I am the Chief Executive Officer of the North Park Public Water District based in Machesney Park, Illinois. I deeply appreciate this opportunity to offer input on the critical issues surrounding algal bloom, cyanotoxins, and our Nation's sources of drinking water. I am here today on behalf of the American Water Works Association, which I serve as president. My remarks reflect the experiences and perspective of AWWA's nearly 50,000 members. Established in 1881, AWWA is the world's oldest and largest non-profit scientific and educational association dedicated to water. Our utility members provide safe and affordable water every day to more than 70 percent of the American population.

As you know, last August an algal bloom in western Lake Erie resulted in the formation of a toxin known as microcystin, requiring the City of Toledo to issue a Do Not Drink Advisory that affected more than 400,000 people. The formation of algal toxins is very complex, and not fully understood. The same can be said for their possible human health effects. But one thing is certain, this problem is always associated with excessive amounts of nitrogen and phosphorus in water.

According to the U.S. Geological Survey, non-point sources, predominantly runoff and air deposition, account for 90 percent of the nitrogen and 75 percent of the phosphorous in our waterways. The fairest and best strategy for reducing the scope and severity of this problem in the future is bringing non-point sources of nutrient pollution under more effective management. At present, though, these sources lie largely outside the jurisdiction of the Clean Water Act.

There are some Federal programs that do have a bearing on nutrients in our water, such as the conservation title of the Farm Bill. However, these conservation programs are voluntary in nature, in contrast to the clean water permit programs, and they are not based upon the quality of receiving waters, nor do they reflect the need to protect downstream sources of drinking water.

Now, drinking water treatment technology does exist to allow drinking water utilities to remove toxins produced by algal blooms, however, this technology is very expensive to acquire and maintain. In addition, removing these toxins after they occur does nothing to protect the ecosystem, and the people within the watershed. As a utility manager, the protection of public health is always my most important priority, and the same is true for the American Water Works Association.

Even before this summer's events, AWWA had taken steps to help water systems at risk from algal events. These include developing and distributing information to assist water systems, and anticipating and responding to source water challenges, including cyanobacterial blooms and cyanotoxins, prepare a water utility manager's guide to cyanotoxins, which is now in its final review, encouraging water systems to evaluate their circumstances to determine whether they might have unrecognized cyanotoxin concern,

and to establish appropriate safeguards, and assisting water systems with guidance and training in emergency preparedness so that they have protocols in place to respond to events like that experienced in Toledo.

Having said those things, utility managers can't solve this problem on their own. We need Federal help. Federal agencies, including U.S. EPA, USDA, should include existing authorities to give much higher priority to nutrient reduction projects that protect downstream drinking water supplies. For example, the Clean Water State Revolving Loan Fund and Farm Bill conservation programs could be targeted and used more effectively to reduce nutrient pollution, and protect drinking water sources.

With regard to drinking water regulation, we support the science-based standard setting process in the Safe Drinking Water Act. EPA has indicated it will use the unregulated contaminant monitoring rule process as the first step in determining whether the regulation of cyanotoxins affords a meaningful opportunity to protect public health, and we support that step.

Finally, and perhaps most important, we ask that Congress consider ways to increase the effectiveness of non-point source pollution programs. This should include discussing the question of whether non-point pollution should be brought under the jurisdiction of the Clean Water Act in an appropriate way. It would not be equitable to put an increasing burden on water systems and their customers to solve this problem if the most significant sources of nutrient pollution are not also asked to do more.

In closing, I want to thank the subcommittee for the leadership that it is taking today in holding this hearing, and I will be happy to answer any questions you may have, either today or in the future. Thank you.

[The prepared statement of Mr. Donahue follows:]

American Water Works Association

The Authoritative Resource on Safe Water SM

Cyanotoxins in Drinking Water

Presented by
John J. Donahue
Chief Executive Officer
North Park Public Water District
Machesney Park, Ill.
&
President
American Water Works Association

Before the House Subcommittee on Environment and the Economy
November 19, 2014

Good morning, Chairman Shimkus and members of the subcommittee. My name is John Donahue, and I am Chief Executive Officer of the North Park Public Water District, based in Machesney Park, Illinois. I deeply appreciate this opportunity to offer input on the critical issues surrounding algae blooms, cyanotoxins and our nation's sources of drinking water.

The North Park Public Water District provides high-quality, affordable and reliable water service to more than 33,000 people in the Machesney Park, Roscoe and Loves Park area of Illinois. I have worked in water and wastewater treatment for 34 years, in roles ranging from Chief Operator, to Superintendent of Water and Wastewater to CEO.

In addition to my day job at North Park Water District, I am currently serving as President of the American Water Works Association (AWWA). My remarks today reflect the experiences and

perspectives of AWWA's members. Established in 1881, AWWA is the world's oldest and largest non-profit scientific and educational association dedicated to water, the world's most important resource. With approximately 50,000 members, we provide solutions to improve public health, protect the environment, strengthen the economy and enhance the quality of life for millions of North Americans. In keeping with AWWA's vision of a better world through better water, our utility members are proud to provide safe and affordable water every day to more than 70 percent of the American population.

Overview. As you know, last August an algal bloom in western Lake Erie resulted in the formation of a toxin known as microcystin in the part of the lake from which the city of Toledo draws its drinking water. For three days, the city had to issue a "do not drink" advisory, affecting more than 400,000 people served by the city water system.

The factors leading to algal blooms and the occasional subsequent formation of a class of toxins called cyanotoxins are very complex and not completely understood. So, too, are the possible human health effects of the various kinds of cyanotoxins that algae can produce, at least at the low levels likely to be encountered in drinking water. Because of the uncertainties surrounding the human health effects of cyanotoxins, city officials felt it wise to issue the "do not drink; do not boil" order last August. Officials at every level of government involved in that emergency acted out of an abundance of caution to protect human health.

There may be uncertainty as to which combination of events – water temperatures, water flow patterns, presence of bacteria, etc. – may lead to a specific type of algal bloom and whether cyanotoxins will be produced. There may be uncertainty about all of the possible human health effects resulting from exposure to cyanotoxins. However, there is no uncertainty about one critical aspect of this problem: it is always associated with excessive amounts of nitrogen and

phosphorus in the water. Moreover, we know a great deal about the sources of those contaminants in our nation's lakes and rivers. Although each watershed is unique and has its own mix of nutrient sources, across the nation the most prominent uncontrolled sources of nitrogen and phosphorus are nonpoint sources, that is, runoff. These sources are at the same time both the hardest to manage and the furthest from being subject to meaningful federal regulatory authority.

According to a 1999 report by the U.S. Geological Survey, nonpoint sources -- predominantly runoff and air deposition -- account for 90 percent of the nitrogen and 75 percent of the phosphorus in U.S. waters. We know that is an old report, but there is no reason to think the situation has fundamentally changed since that study. Indeed, it is likely that as point sources of pollution, mainly municipal and industrial wastewater treatment plants, have been made subject to ever-tighter permit conditions under the Clean Water Act, the relative importance of nonpoint sources has only grown larger.

While point sources, such as Publicly Owned Treatment Works, storm sewers, sewer overflows, and industrial discharges contribute to overall loadings of nutrients in the nation's waters, it remains beyond dispute that nonpoint sources are the predominant source of phosphorous and nitrogen in many watersheds.

On the time-tested wisdom that an ounce of prevention is worth a pound of cure, I have come here today to say straightforwardly that the fairest and best strategy for reducing the scope, scale, and impact of this problem in the future is to bring nonpoint sources of nutrient pollution under more effective management. At present, these sources lie largely outside the jurisdiction of the Clean Water Act.

To be sure, there are some federal programs that can have a bearing on the contaminants we are talking about today, such as the conservation title of the Farm Bill. However, the conservation programs of the Farm Bill are voluntary in nature, and the program requirements are not based upon the quality of receiving waters or the need to protect downstream sources of drinking water. In contrast, Clean Water Act regulations require point sources to obtain water quality and technology-based permits with fixed terms. Permit conditions are reviewed on a regular basis and are routinely ratcheted towards greater stringency based on the quality of the receiving stream. These important features are absent from the Farm Bill's voluntary programs.

It is true that states have authority to control nonpoint sources, but most state programs are limited and are too weak to adequately protect U.S. water supplies. If these programs were stronger, the unfortunate events in Toledo might not have occurred.

Drinking water treatment technology does exist to allow drinking water utilities to remove toxins produced by algal blooms in source waters, but this technology is very expensive to acquire and maintain. In addition, removing these toxins after they occur versus preventing them from occurring in the first place does absolutely nothing to protect the ecosystem and the people within the watershed impacted by these algal blooms.

The question to be answered is this: Should the financial burden of solving this important problem fall solely on the customers of the affected public water systems, or also on those responsible for creating or contributing to the overall problem in the first place?

I'd like to describe what we do <u>not</u> think would be a fair response to the problem of excessive nutrient pollution. It would <u>not</u> be fair to put the entire burden of addressing this problem on municipal wastewater and drinking water utilities. It would not be fair to them or their customers

to require that municipal utilities spend more of their financial resources attempting to buy a pound of cure to this problem, when many ounces of prevention are available at a lower cost.

For drinking water professionals the protection of public health is clearly the most important priority, and we will do whatever is necessary to ensure that the water we deliver to our customers is safe every day. But water systems and their customers are in a real sense the victims of this pollution. It would not be fair to put the entire burden of response on them.

What AWWA Is Doing. Because we recognized the problem of algal blooms and cyanotoxins even before the unfortunate episode this summer, AWWA has undertaken certain proactive steps towards helping water systems at risk from this kind of event. Among other things:

1. AWWA is developing and distributing information to assist water systems in anticipating and responding to source water challenges, including cyanobacterial blooms and cyanotoxins. We are preparing a water utility manager's guide to cyanotoxins, which is now undergoing final review. This will be available to utility managers who have to cope with the problem of algal blooms, providing an overview of the current knowledge on algal blooms, their health effects, methods for testing for cyanotoxins, and treatment options for removing cyanotoxins from drinking water.
2. AWWA is encouraging water systems to evaluate their circumstances to determine whether they might have an unrecognized cyanotoxin concern, and to establish appropriate safeguards.
3. AWWA is assisting water systems with guidance and training on emergency preparedness so that water systems have protocols in place to respond to events like that experienced by Toledo, including early and effective communication with the public.

What Can the Federal Government Do? To help prevent future incidents like that experienced in Toledo, it is critical that this nation brings nonpoint sources of water pollution under more effective control. We recommend that Congress consider ways to greatly increase the effectiveness of nonpoint source pollution programs, including the question of whether nonpoint sources of pollution should be brought under the jurisdiction of the Clean Water Act.

In the shorter run, federal agencies, including EPA and USDA, should use existing authorities to give much higher priority to nutrient reduction projects that protect downstream drinking water supplies and therefore, public health. Among other tools available, the Clean Water State Revolving Loan fund and Farm Bill programs can be targeted and used more effectively to protect drinking water sources.

With regard to drinking water regulation, we support the science-based standard setting process embodied in the Safe Drinking Water Act. EPA should use the Unregulated Contaminant Monitoring Rule and the Contaminant Candidate List processes as the first steps in determining whether the regulation of cyanotoxins affords a meaningful opportunity to protect public health. If it does, EPA should set a National Primary Drinking Water Regulation for these contaminants.

Finally, we also recommend that EPA and USDA emphasize water quality objectives that specifically recognize the protection of drinking water supplies, rather than thinking of drinking water as an indirect beneficiary of generic nutrient reduction.

Conclusion. In closing I want to thank the subcommittee for the leadership it is taking today in holding this hearing. The American Water Works Association is eager to help in any way it can as the nation moves forward in addressing this important issue.

I will be happy to answer any questions you may have concerning my statement, either today or in the future.

Attached to this statement is a summary of current technical knowledge concerning algae and cyanotoxins.

Attachment to Testimony of John Donahue
Before the House Subcommittee on Environment and the Economy
November 19, 2014

Technical Issues Concerning Cyanobacteria and Cyanotoxins.

Cyanobacteria, also known as blue-green algae, are photosynthetic bacteria that can live in many types of water, and are important components of aquatic ecosystems. While critical to water and soil resources, excessive cyanobacteria growth can cause ecological and public health concerns, as we have seen. Rapid, excessive cyanobacteria growth is commonly referred to as a "bloom."

Cyanobacteria blooms can be inches thick, especially those located near the shorelines of lakes and reservoirs, and they commonly occur during warm weather. They sometimes appear foamy or accumulate as mats or scum covering the water surface. Some cyanobacteria sink and rise through the water column, depending on the time of day. Cyanobacteria blooms may appear blue, blue-green, brown and other colors depending on many factors. Sometimes blooms are mistaken for materials such as spilled paint because they can have a similar appearance.

Cyanobacteria can cause problems for water utilities, including

- Unpleasant tastes and odors, usually earthy and musty;
- Interference with water treatment plant performance;
- Increased disinfection byproduct precursors; and
- Production of **cyanotoxins**. As of November 2014, EPA has not established a safe level for cyanotoxins in drinking water.

Blooms Are Not Always Harmful

Cyanobacteria blooms that produce cyanotoxins are sometimes called Harmful Algal Blooms (HABs). This can be misleading because cyanobacteria that are capable of producing cyanotoxins do not always produce those toxins. Further complicating the picture, while some cyanobacteria that produce cyanotoxins also produce taste and odor problems, not all taste and odor-producing blooms produce cyanotoxins, and not all cyanotoxin-producing blooms produce taste-and-odor problems.

Cyanotoxins make up a large and diverse group of chemical compounds that differ in molecular structure and toxicological properties. They are generally grouped into major classes according to their toxicological targets: liver, nervous system, skin, and gastrointestinal system. A single bloom may contain multiple types of cyanotoxins, and some cyanobacteria can simultaneously produce several toxins.

Cyanotoxins and Human Health

Human exposure to cyanotoxins can occur in several ways:

(1) Ingestion of contaminated water, fish, or shellfish;

(2) Dermal contact with water containing cyanotoxins;

(3) Inhalation or ingestion of aerosolized toxins; and

(4) Consumption of drinking water impacted by a toxic cyanobacterial bloom.

While confirmed occurrences of adverse health effects in humans are rare, some incidents have been documented in different parts of the world. In 1931, approximately 8,000 people fell ill when their drinking water originating from tributaries of the Ohio River that had been contaminated by a massive cyanobacteria bloom. In 1975, approximately 62% of the population

of Sewickley, Penn., reported gastrointestinal illness, which the Centers for Disease Control attributed to cyanotoxins created in open finished water storage reservoirs.

Health effects of cyanotoxins can be acute or chronic, and have been observed in the liver, nervous system, and gastrointestinal system. Liver cyanotoxins (i.e. microcystins) seem to be the most commonly found in cyanobacteria blooms and the most frequently studied. Scientists have identified at least 80 varieties of microcystins. Both acute and chronic effects of microcystins have been investigated through laboratory animal studies. In studies, microcystins have rapidly concentrated in the livers of test animals.

Animal studies for the effects of microcystins conducted using high doses have reported organ damage, heart failure, and death. Long-term animal studies of chronic effects from repeated exposure have found liver injury, renal damage, and an increased number of tumors.

The impacts of chronic or acute cyanotoxin exposure in humans are not clear, especially in the low levels more likely to be found in treated drinking water. Studies in China have reported a correlation between liver or colorectal cancer with the consumption of water contaminated by microcystin-producing cyanobacteria blooms. More research is needed to understand whether and how cyanotoxins may promote tumor growth and cancer.

Anatoxin-a targets the nervous system and can induce paralysis and death by respiratory failure at very high levels of exposure. Other non-lethal cyanotoxins can trigger fevers, headaches, muscle and joint pain, diarrhea, vomiting, or allergic skin reactions. Children are at a higher risk than adults of experiencing toxic effects.

Previous Episodes with Cyanotoxins

Although they have been observed and reported more frequently in recent years, cyanobacterial blooms are not a new problem. At least 35 states have reported cyanobacterial blooms, with many of those blooms producing cyanotoxins. When considering cyanobacterial blooms and cyanotoxin events, it is important to distinguish between ***recreational water*** and ***drinking water***. Cyanotoxin producing blooms have been identified in recreational waters more frequently in recent years, and contact recreation (such as swimming) has been restricted more often in the last decade than in previous decades. In the summer of 2006, at least 12 states posted advisories or closed lakes and rivers due to elevated levels of cyanotoxins, out of concern for people and animals.

Cyanotoxins have been found less often in drinking water supplies than in recreational waters. A 2000 Florida finished-drinking water survey reported cyanotoxins ranging from below detection level to 12.5 ug/L microcystin, 8.46 ug/L anatoxin-a, and 97.1 ug/L cylindrospermopsin. As of late 2014, nationwide occurrence data for finished drinking water has not been gathered, although it could be conducted in the future through the fourth round of the Unregulated Contaminant Monitoring Rule (UCMR).

Regulations and Advisories

As of late 2014, there are no federal regulatory standards or guidelines for cyanobacteria or cyanotoxins in drinking water. The Safe Drinking Water Act (SDWA) requires EPA to publish a list of substances of potential concern that warrant further study, known as the Contaminant Candidate List (CCL). EPA uses the CCL to prioritize research efforts to help determine whether a contaminant should be considered for regulatory action. Cyanotoxins are listed on the third CCL as a group, with EPA identifying research needs for them and prioritizing development of information on anatoxin-a, microcystin-LR, and cylindrospermopsin. AWWA strongly supports

such science-based decision making regarding drinking water regulations for contaminants that may pose a risk to human health.

For microcystin-LR, the World Health Organization (WHO) has developed a provisional finished drinking water guideline of 1 µg/L, based upon chronic exposure. Results from a 2014 survey of state drinking water administrators indicate that five states out of the 34 states responding to the survey have established drinking water advisory thresholds for microcystin, and two states have established drinking water advisory thresholds for other cyanotoxins. In addition to these five states, four states have draft policies and eight more are preparing policies.

Factors Leading to an Algal Bloom

Field experience shows that the following conditions are the most important factors leading to a cyanobacterial bloom:

- The many types of cyanobacteria and diversity of their habitats. This diversity makes it complicated to predict the precise conditions favoring the growth of cyanobacteria. Physical factors that affect whether cyanobacteria grow include available light, weather conditions, water flow, temperature, and mixing within the water column. Chemical factors include pH and nutrient concentrations (primarily nitrogen and phosphorus).
- Water Temperature. Most algae favor temperatures between 60 and 80°F; optimum conditions for many cyanobacteria are in even warmer waters, but some cyanobacteria will grow at temperatures below 60°F.
- Nutrients. Elevated levels of nutrients favor algae and cyanobacteria growth. Cyanobacteria are favored by a low nitrogen to phosphate ratio (<6:1 total N to P).

- Flow. Quiescent or low flow conditions favor cyanobacteria blooms. Turbulence disrupts the bacteria's buoyancy and light can be limiting at depth when there is vertical circulation in the water column.
- Thermal stratification. Cyanobacteria can regulate their buoyancy giving them a competitive edge when the water column is stratified. Stratification can also affect nutrient availability to favor cyanobacteria.
- Rainfall. Large and frequent storm/heavy rain events can temporarily disrupt cyanobacteria blooms by flushing and de-stratification within a water body; frequent small rainfall events can lead to cyanobacteria blooms by contributing nutrients that favor cyanobacterial growth without disrupting water body stratification.

Cyanobacteria blooms usually develop in waters rich in nutrients, especially phosphorus. Such nutrients originate from both point and nonpoint sources. Municipal wastewater and stormwater as well as agricultural runoff are common sources of nutrients. Failing septic systems can also be contributors. Some water bodies already contain enough "stored" nutrients in their sediments and aquatic ecosystem that cyanobacteria blooms can occur without additional nutrient input from any of these sources. Most of our nation's lakes and reservoirs are from 50 to more than 100 years old and many of them have been accumulating sediment and nutrients for a long time. In some cases, the cycling of nutrients within the reservoir is the major cause of algae blooms. In-lake mitigation practices may need to be considered alongside watershed management measures to effectively deal with this problem.

Managing cyanobacteria blooms effectively requires an understanding of the limnology of the water supply. The conditions that trigger blooms reflect site-specific conditions (e.g., the presence of cyanobacteria, nutrient levels, and hydraulic conditions). Some utilities experience blooms in surface water supplies in early summer when the water reaches a sufficiently warm

temperature. Others witness blooms when the thermocline begins to destratify in late summer or early fall (i.e. when turnover begins in the water column). Blooms may take place after a rain event or they may occur after a series of sunny days. Algae and zooplankton as well as cyanobacteria can flourish under particular source water conditions and can have implications for drinking water treatment. By understanding the limnological conditions of their particular source waters, utilities gain a better understanding of the conditions that are most likely to lead to a bloom.

Experiencing a cyanobacteria bloom does not always mean there is a cyanotoxin problem. Multiple strains of cyanobacteria can exist in a single bloom, and not all strains are capable of producing cyanotoxins. Even strains that can produce toxins do not always do so in all conditions, and the conditions that trigger or inhibit production of cyanotoxins remain poorly understood. Laboratory analysis is usually needed to determine if the cyanobacteria are actually producing toxins.

While some of the same types of cyanobacteria can produce cyanotoxins along with taste and odor compounds, such as geosmin and 2-Methylisoborneol (MIB), *a taste and odor episode does not necessarily mean cyanotoxins are also present.* In addition, some cyanobacteria that produce cyanotoxins do not produce these musty and earthy compounds. Cyanotoxin production and taste and odor production should not be assumed to always occur together. However, a history of taste and odor concerns linked to cyanobacteria blooms in a particular water body indicates at least the potential for cyanotoxin contamination.

Detection of Cyanotoxins

Several assays and analytical methods have been developed to either screen for or quantify cyanotoxins. In some cases, a utility's laboratory may be able to perform testing, provided the

necessary laboratory equipment and expertise are available. In other instances, especially for advanced techniques, an external laboratory with experience and appropriate approvals may be recommended. Not all laboratories are equipped to analyze samples for cyanotoxins.

Treatment of Drinking Water

Identifying which cyanobacteria and cyanotoxins are present helps utilities know they are using the appropriate treatment processes. Key factors to consider are the type of cyanotoxin and whether it is intracellular (contained within the cyanobacteria cells) or extracellular (dissolved in the water). Intracellular toxins can be eliminated by removing the cyanobacteria cells. Extracellular toxins are generally more difficult to remove. Under some circumstances water treatment can release toxins from cyanobacteria, turning the toxins from intracellular to extracellular. Research is currently underway concerning the most effective means of removing cyanobacteria cells and their toxins from drinking water. Treatment selection is context-specific and depends upon the concentration of cyanobacteria and/or cyanotoxins to be removed or inactivated. Careful site-specific examination is necessary prior to making definitive treatment decisions. The exact configuration of treatment systems may determine the effectiveness of any particular treatment option.

Common cyanotoxin treatment practices and their relative effectiveness

Treatment Process	Relative Effectiveness
Intracellular Cyanotoxins Removal (Intact Cells)	
Conventional coagulation, sedimentation, filtration	Effective for the removal of intracellular/particulate toxins by removing intact cells. It generally is more cost effective than chemical inactivation/degradation, removes a higher fraction of intracellular taste and odor compounds, and is easier to monitor.
Flotation	Flotation processes, such as Dissolved Air Flotation (DAF), are effective for removal of intracellular cyanotoxins since many of the toxin-forming cyanobacteria are buoyant.
Pretreatment oxidation (oxidant addition prior to rapid mix)	Overall, pretreatment oxidation can either assist or make treatment more difficult, depending upon the situation. Pre-oxidation processes may lyse cells, causing the cyanotoxins contained within to release the toxins. Ozone may be an exception (see "Ozone" below) because it both lyses cells and oxidizes the cyanotoxins.
Membranes (microfiltration or ultrafiltration)	Microfiltration and ultrafiltration are effective at removing intracellular/particulate toxins. Typically membranes require pretreatment.
Extracellular Cyanotoxins Removal/Inactivation	
Chlorination	Effective for oxidizing extracellular cyanotoxins (other than anatoxin-a) when the pH is below 8
Chloramines	Not effective.
Potassium Permanganate	Effective for oxidizing microcystins and anatoxins. Not effective for cylindrospermopsin and saxitoxins.
Chlorine dioxide	Not effective with does typically used for drinking water treatment.
Ozone	Very effective for oxidizing extracellular microcystin, anatoxin-a and cylindrospermopsin.
Activated Carbon (Powdered Activated Carbon and Granular Activated Carbon)	Most types of carbon are generally effective for removal of microcystin, anatoxin-a, saxitoxins and cylindrospermopsin. Because adsorption varies by carbon type and source water chemistry, each application is unique; activated carbons must be tested to determine effectiveness.
UV Radiation	When used at high doses UV degrades toxins. UV doses used for disinfection are not adequate to destroy cyanotoxins.

Membranes (reverse osmosis or nanofiltration)	Reverse osmosis is effective removing extracellular cyanotoxins. Typically, nanofiltration has a molecular weight cut off of 200 to 2,000 Daltons, which is larger than some cyanotoxins. Individual membranes must be piloted to verify toxin removal.

Controlling Nutrient Levels

It is always more effective to prevent contamination of sources of drinking water than it is to clean up the water after contamination. In that light, we point out that:

1. Managing nutrient levels in surface waters, especially nitrogen and phosphorus, is critical to reducing the likelihood of cyanobacteria blooms and thus the potential for the production and release of cyanotoxins.
2. Elevated levels of nutrients in the water supply can contribute to a number of other drinking water quality challenges, including taste and odor complaints, reduced filter run times in water treatment plants, and increased potential for disinfection by-product formation.
3. Managing nutrient levels in public water supplies is already a major policy objective for EPA and USDA.

The events last August in Toledo place an exclamation point on the urgency of protecting the nation's water supplies and highlights the need to make the management of nutrients in those supplies a national priority. No city should be put in the position that Toledo found itself in, and we strongly recommend steps to prevent such events in the future.

Each watershed has its own unique mix of major nutrient discharges, but universally, the most challenging source of nutrients to manage is non-point source pollution. It is within Congress'

power to set new policy objectives for managing non-point source pollution under the Clean Water Act. Under the current law, communities across America are shouldering significant costs as storm water systems and wastewater treatment facilities face more and more stringent nutrient control requirements. These control requirements carry significant cost and lead to significant rate increases for utility customers. In many cases these costs are borne to reduce nutrients by a meaningless percentage compared to uncontrolled or relatively uncontrolled nonpoint sources in the watershed, because municipal sources are subject to permits while other important sources are not. The rate increases borne by customers of municipal water and wastewater systems also reduce the utility's ability to address other problems, such as aging infrastructure or improving resilience to disasters or unforeseen events. Communities cannot afford to bear the entire cost of managing nutrients just because the municipal facilities that serve them are subject to Clean Water Act permits, and no community should be expected to do so if we fail as a nation to bring nonpoint sources of nutrient pollution under control.

The Federal Role in Managing Cyanotoxins

The federal government has a number of programs that can provide significant and immediate assistance in helping drinking water systems anticipate and respond to the potential risk posed by cyanotoxins. There are already considerable synergies between several current program goals and the kinds of assistance helpful to water systems. Ready examples include:

1. Coordinated federal focus. Nationally, responsibility for managing in-stream water quality is typically delegated to EPA, based on the Clean Water Act and other statutes. However, programs in a wide cross-section of federal agencies are central to evaluating and ultimately managing cyanotoxins. As an example, Farm Bill conservation title funds could be used more effectively to reduce nonpoint nutrient runoff as a preventative

measure, and could be targeted to water bodies threatened with excessive nutrients that also serve as drinking water supplies.

2. Data aggregation. EPA and CDC have both organized websites focused on harmful algal blooms. Due to the limited resources and historic purposes of these sites, there is substantial opportunity to consolidate water quality data, incorporate remote sensing information, and make available other data important to inform the management of nutrient levels in water supply watersheds. Data sites like those provided by USGS on stream flows and USDA on drought have been central to effective resource management and leverage limited federal dollars very effectively.

3. Clean Water Act stream body assessments for nutrients. Current CWA programs enumerate nitrogen and phosphate levels, but limited consideration is given to determining the potential for cyanobacteria blooms or to correlate nutrient conditions with available cyanotoxin concentrations with respect to water supplies. Providing more information on nutrient loadings and known cyanotoxin levels would be extremely helpful. Congress should also examine renewed funding of Clean Lakes program under EPA, Section 314 of the Clean Water Act. This program was used in the 1980s and '90s to fund research into limnology and make assessments of the nation's lakes. It could be used to study the cost effectiveness of in-lake techniques.

4. Harmful Algal Bloom and Hypoxia Research and Control Act. We applaud Congress for passing the Harmful Algal Bloom and Hypoxia Research and Control Act Amendments last June. We urge Congress to make sure that the research contained in this act receive robust funding, and that Congress to pay close attention to the research reports

that will result from this act.

5. Scrutiny under the SDWA. Several cyanotoxins are on the SDWA contaminant candidate list and the agency anticipates including some of these cyanotoxins in the next cycle of required unregulated contaminant monitoring. These actions are the first steps in a science-based SDWA regulatory decision-making process. AWWA's members appreciate that EPA is taking steps to inform water utilities about cyanotoxins now, while this regulatory process proceeds.

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Summary of Statement
by John J. Donahue, CEO North Park Public Water District
before the House Subcommittee on Environment and the Economy
Nov. 19, 2014

- North Park Public Water District provides water service to more than 33,000 people in the Machesney Park, Roscoe and Loves Park area of Illinois.
- I am testifying today on behalf of the American Water Works Association (AWWA).
- The factors leading to algal blooms and the occasional subsequent formation of a class of toxins called cyanotoxins are very complex and not completely understood.
- So, too, are the possible human health effects of the various kinds of cyanotoxins that algae can produce, at least at the low levels likely to be encountered in drinking water.
- There is no uncertainty about one critical aspect of this problem: it is always associated with excessive amounts of nitrogen and phosphorus in the water.
- According to a 1999 report by the U.S. Geological Survey, nonpoint sources – predominantly runoff and air deposition – account for 90 percent of the nitrogen and 75 percent of the phosphorus in U.S. waters.
- The fairest and best strategy for reducing the need to issue "do not drink" orders in the future is to bring nonpoint sources of nutrient pollution under more effective management.
- AWWA is educating and preparing water utility managers for cyanotoxins threats.
- We recommend that Congress consider ways to greatly increase the effectiveness of nonpoint source pollution programs, including the question of whether nonpoint sources of pollution should be brought under the jurisdiction of the Clean Water Act.
- In the shorter run, federal agencies, including EPA and USDA, should use existing authorities such as the Clean Water Act state revolving loan fund and conservation programs under the Farm Bill to give much higher priority to nutrient reduction projects that protect downstream drinking water supplies and public health,
- EPA should use the Unregulated Contaminant Monitoring Rule and the CCL processes as the first steps in determining whether the regulation of cyanotoxins affords a meaningful opportunity to protect public health. If it does, EPA should set a National Primary Drinking Water Regulation for these contaminants.
- We also recommend that EPA and USDA emphasize water quality objectives that specifically recognize the protection of drinking water supplies, rather than thinking of drinking water as an indirect beneficiary of generic nutrient reduction.
- We thank the Subcommittee for its leadership in pursuing these topics and offer the experiences and expertise of our membership in further addressing cyanotoxins and related issues.

Mr. SHIMKUS. Thank you very much. Now I would like to turn to Ms. Lynn Thorp, and you are recognized for 5 minutes.

STATEMENT OF LYNN THORP

Ms. THORP. Thank you Chairman Shimkus, Ranking Member Tonko, and members of the subcommittee. My name is Lynn Thorp. I am the National Campaigns Director for Clean Water Action. We are a national organization working in 15 states on a wide range of issues, including Safe Drinking Water Act implementation, and protecting drinking water sources. Clean Water Action urges the committee to support aggressive action to reduce the nitrogen and phosphorous or nutrient pollution that cause harmful algal blooms, which in turn produce cyanotoxins. To address cyanotoxins only through drinking water regulation and treatment is inadequate, and transfers the burden of pollution control to water systems and their consumers. Sources of nutrient pollution, as we have heard, include agriculture practice, storm water, sewer and septic systems, and fossil fuel use in various sectors. Population growth and climate change exacerbate the problem.

As we have heard, some cyanotoxins produced by certain harmful algal blooms cause liver damage, nerve damage, and skin damage. Excessive nutrients contribute to the growth of these harmful algal blooms. But this pollution causes other drinking problems as well. The development of nitrate, development of increased disinfection byproducts, all of these lead to increased public health risks in drinking water and costs for consumers. Nitrogen and phosphorous also cause other environmental problems, including dead zones and impaired water quality, and we know that nutrient pollution causes demonstrated economic losses in fishing, recreation, and water dependent businesses.

EPA and some states have taken expeditious action to address cyanotoxins in drinking water. As we have heard, EPA has placed three cyanotoxins on the contaminant candidate list, an important Safe Drinking Water Act implementation step that will lead to the research we need to learn more and move on the path toward regulation. EPA is also conducting toxicity and human health assessments, developing drinking water health levels, and also developing laboratory methods so that we can measure cyanotoxins consistently.

I want to note that EPA and states are conducting these activities in the face of stagnant and shrinking budgets, and possibly inadequate capacity to implement the Safe Drinking Water Act, and to reduce drinking water threats as aggressively as the public expects. EPA has the authority, under our Nation's other landmark water law, the Clean Water Act, to address nutrient pollution from all sources. Despite the agriculture exemptions in the Clean Water Act, progress can be made on addressing a significant source.

There are other immediate opportunities, as we have heard, for EPA to help reduce nitrogen and phosphorous pollution. The proposed definition of waters of the United States under the Clean Water Act, which clarifies the protection of streams, wetlands, and other waters, is a good example. These water bodies are a vital part of our water infrastructure because they filter pollution, in-

cluding nutrients, before it makes its way to downstream water bodies, often which service drinking water sources.

In an upcoming Clean Water Act rulemaking limiting toxic water discharges from power plants, EPA has an opportunity to address 30 million pounds of nitrogen, and 682,000 pounds of phosphorous discharged by power plants annually into surface water. As noted here earlier today, other Federal agencies, including the USDA and states, can take significant action to address nutrient pollution. Innovative partnerships can also play a role. For example, the Source Water Collaborative is made up of diverse stakeholders, including regulators, drinking water utilities, planners, and environmental organizations working together to advance drinking water source protection at the local, state, and Federal levels.

The Safe Drinking Water Act's multi-barrier approach starts with source water protection. Clean Water Action likes to say we should put drinking water first, which means making decisions about upstream activities with a focus on preventing drinking water impacts downstream. This results in better choices, which prevent other environmental and economic impacts. This is certainly true when it comes to nutrient pollution. Curbing nitrogen and phosphorous inputs is the right choice for drinking water protection, and is the multi-benefit approach.

[The prepared statement of Ms. Thorp follows:]

CLEAN WATER ACTION

Testimony of
Lynn W. Thorp
National Campaigns Director
Clean Water Action

Before the
Subcommittee on Environment and the Economy
of the
U.S. House of Representatives Energy and Commerce Committee

Cyanotoxins in Drinking Water
November 19, 2014

Good morning. I am Lynn Thorp, National Campaigns Director at Clean Water Action. We appreciate the opportunity to provide testimony at today's hearing. Clean Water Action is a national organization working in 15 states on a wide range of environmental and health issues. Our work includes a focus on Safe Drinking Water Act implementation and on protecting drinking water sources through upstream pollution prevention programs.

Clean Water Action urges the Committee to use its authority and to work with all other relevant Committees and Members of Congress to support aggressive action to reduce the nitrogen and phosphorus pollution that cause Harmful Algal Blooms, which in turn produce cyanotoxins. The most cost-effective and common sense way to prevent cyanotoxin contamination of drinking water sources is to reduce the nitrogen and phosphorus – or nutrient – pollution that is causing numerous other drinking water, public health, environmental and economic harm. Some states, including Ohio, the U.S. Environmental Protection Agency and the drinking water utility sector have acted expeditiously to address emerging information about public health risks of some cyanotoxins in drinking water. These efforts should continue. However, action to address only cyanotoxins in drinking water is woefully inadequate and risks transferring the burden of pollution control to Public Water Systems and their customers, as well as to those relying on private wells for their drinking water.

Nitrogen and phosphorus pollution is a multi-faceted, growing and serious threat to water quality and public health. Despite a preponderance of evidence and numerous federal and state efforts to address the problem, it is getting worse. Occurrence of cyanotoxins known to cause health impacts at levels of concern in drinking water sources is the latest example of the outcomes of failing to address this nutrient pollution at its source.

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Nitrogen and Phosphorus Pollution is Increasing

Sources of nitrogen and phosphorus pollution include agriculture (excess fertilizer, manure and soil erosion), stormwater, sewer and septic systems and fossil fuel use in electric power generation, industry, transportation and agriculture. Population growth is leading to increased nitrogen and phosphorus pollution. Climate change exacerbates the problem. For example, poor soil quality leads to application of more nitrogen and phosphorus fertilizer. Warmer temperatures and extreme weather events lead to more algal blooms at different times of year, including the Harmful Algal Blooms which produce cyanotoxins.

Nitrogen and Phosphorus Pollution Cause Public Health Risk in Drinking Water & Cost the American People Money

U.S. EPA has identified three cyanotoxins for which enough occurrence and health data exist to place them on the Safe Drinking Water Act Contaminant Candidate List. The state of Ohio has set thresholds for drinking water for four cyanotoxins. These cyanotoxins cause liver, nerve and skin damage. They are produced by some Harmful Algal Blooms.

Nitrogen also contributes to development of nitrate in drinking water. Children under six months of age are particarly susceptible to the effects of nitrates in drinking water, which include respiratory problems and methemoglobinemia or "blue baby syndrome." Additional drinking water treatment for nitrates has led to significant increased costs for Public Water Systems and their consumers.

Nitrogen in drinking water can increase formation of disinfection byproducts in drinking water treatment plants, resulting in treatment complications and increased costs to prevent byproduct development in order to meet SDWA regulations and protect public health.

Nitrogen and Phosphorus Cause Numerous Other Environmental Problems and Have Negative Impacts on Local Economies

Nitrogen and phosphorus – nutrient pollution – result in many other negative impacts including: dead zones; impaired water quality; impacts on fishing and recreation and harm to wildlife, livestock and pets. According to EPA:

- The 15,000 nutrient-related impairment listings in 49 states is likely to be a underestimate
- There are 168 hypoxic zones in U.S. waters
- 78% of Assessed coastal areas exhibit eutrophication symptoms

Nutrient pollution is causing economic losses due to impacts on fishing and recreation and other water quality problems. This recognized and severe threat is growing and population growth ensures that it

will continue to do so if not addressed through aggressive efforts to prevent nitrogen and phosphorus pollution.

EPA and State Action – Continued Expeditious Action on Drinking Water Demands Adequate Resources

EPA and some states have taken expeditious action to address emerging information on public health risks from some cyanotoxins in drinking water. For example, the state of Ohio's Public Water System Harmful Algal Bloom Reponse Strategy, which began in response to the National Lakes Assessment data released in 2009, includes monitoring of drinking water sources, reservoir management strategies, drinking water treatment optimization and development of drinking water thresholds for four cyanotoxins.

EPA has placed three cyanotoxins in the 3rd SDWA Contaminant Candidate List, which sets in motion research and analysis to support potential regulation. EPA is also conducting a Toxicity Assessment and a Human Health Assessment and developing Drinking Water Health Advisories for cyanotoxins of concern. EPA's research into analytical methods is also critical to assessing the scope of the problem and being able to measure cyanotoxins consistently.

These state and federal efforts are important to protecting public health where cyanotoxins connected to drinking water risk are present in source water. EPA is conducting these activities in the face of stagnant or shrinking budgets and inadequate capacity to implement the Safe Drinking Water Act and to conduct the scientific assessments and other steps required by the statute. Similar resource constraints limit the capacity of state drinking water programs to address drinking water threats as aggressively as the public and state and federal law demand.

Our Nation's Water Laws Should Work Together

Integration of the Clean Water Act and the Safe Drinking Water Act has been an area of increasing interest to diverse stakeholders during the past decade, is part of EPA's 2010 Drinking Water Strategy and is embodied in EPA's Strategic Plan for 2011-2015. Using Clean Water Act authority to prevent the nitrogen and phosphorus pollution that leads to drinking water threats is consistent with EPA's pollution prevention goals, which state that the burden of contamination caused by upstream activity should not be shifted to a downstream user through potential treatment costs. EPA should use all available Clean Water Act authority to address all sources of nitrogen and phosphorus loadings not only to protect drinking water but to address the numerous other impacts of nutrient pollution. Despite the agriculture exemption in the Clean Water Act, progress can be made on addressing this significant source of the pollution that contributes to cyanotoxin production and other public health and environmental impacts. A good example is the Chesapeake Bay TMDL (Total Maximum Daily Load clean-up plan), in which

federal, state and local jurisdictions will partner to reduce nitrogen loadings by 25% and phosphorous loadings by 24%.

EPA also has several immediate immediate opportunities to protect drinking water and to address the nitrogen and phosphorus pollution which leads to cyanotoxin production and other public health and environmental risks. For example:

- EPA and the U.S. Army Corps of Engineers (Corps) proposed *Definition of Waters of the United States Under the Clean Water Act* (Clean Water Rule) clarifies the protection afforded to streams, wetlands and other waters under Clean Water Act programs. Streams and wetlands are a vital part of our nation's water infrastructure, and their role in filtering pollutants including nitrogen before they make their way to larger surface waters is critical in light of growing nutrient pollution. In *Connectivity of Streams and Wetlands to Downstream Waters*, a synthesis of scientific literature, EPA notes that one study demonstrated that the complex processes occurring in small streams can remove as much as 20-40% of nitrogen before it makes its way to larger water bodies downstream. EPA found current scientific literature to be "replete" with data supporting the role of wetlands as sinks for nutrients. Protecting these natural pollution filters is a common sense way to protect drinking water sources and prevent other negative impacts of nitrogen and phosphorus pollution.

- Clean Water Act Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category are currently being finalized. According to EPA, power plants discharge 30 million pounds of nitrogen and 682,000 pounds of phosphorus annually into surface water. A strong final rule which prevents the maximum amount of nutrient discharges from power plants is a common-sense way for the Clean Water Act to work to protect drinking water sources and to prevent other environmental and economic impacts.

- In all Clean Water Act rulemaking, EPA should quantify the benefits of avoided drinking water treatment cost and reduced public health risks when Clean Water Act programs will reduce contamination of drinking water sources.

Other Federal Agencies, State and Local governments and Other Stakeholders

EPA is not the only federal agency with a role in protecting drinking water sources from the Harmful Algal Blooms that produce cyanotoxins and in reducing the nitrogen and phosphorus pollution responsible for numerous environmental and economic impacts. For example, the U.S. Department of Agriculture National Resources Conservation Service programs play a critical role in helping farmers reduce polluted runoff. State nutrient reduction programs, including setting numeric nutrient criteria with assistance from EPA, are critical components of nitrogen and phosphorus pollution reduction. States can also put nutrient management programs in place, prohibit manure spreading that leads to the

highest runoff including when the ground is frozen and require stream buffers. Local land use and zoning decisions can also be used to address sources of nutrient pollution including stormwater runoff.

Innovative programs like the Source Water Collaborative can also support action to reduce nitrogren and phosphorus pollution. The Source Water Collaborative is made up of diverse stakeholders including regulators, drinking water utility representatives, planners, environmental and health organizations and others working together to advance drinking water source protection at the local, state and federal levels.

Putting Drinking Water First Has Multiple Benefits

The Safe Drinking Water Act is implemented with a "multi-barrier" approach, which starts with source water protection. Preventing drinking water contamination is a common-sense way to keep pollutants out of the drinking water that goes into the drinking water treatment plant and to avoid increased costs to those paying water bills when contamination and regulation leads to the need to install new treatment. Public Water Systems and their ratepayers should not be responsible for cleaning up pollution that can be prevented before it gets into drinking water sources. As noted above, transferring the burden of pollution onto downstream users is counter to EPA's own policy. Regulating cyanotoxins in drinking water is not sufficient to prevent this shift of burden and will not address the many other environmental and economic impacts of nitrogen and phosphorus pollution. In our work, Clean Water Action advocates for Putting Drinking Water First, which means making decisions about upstream activities with a focus on potential drinking water impacts downstream. Putting Drinking Water First not only results in better drinking water protection but leads to better choices which can prevent other environmental and economic impacts. This is certainly true when it comes to excessive nutrients. Curbing nitrogen and phosphorus pollution is the right choice for drinking water protection and is the "multi-benefit approach."

Mr. SHIMKUS. Gentlelady yields back her time, and thank you very much. I will now recognize myself for 5 minutes for my round of questioning.

First, to Director Butler, which stage would you say we are in right now on the state of the science of microcystin, particularly as it relates to health effects?

Mr. BUTLER. Thank you, Mr. Chairman. Just recognize that I am not a scientist, like Dr. Grevatt, but—so I will give you my layman's understanding of it. So I would say that the—a lot of work has been done, much more is needed, and I think much more quickly than has been advanced in the past, so that is why we have applauded Dr. Grevatt and U.S. EPA Research and Development office for accelerating the research about the health advisory levels for microcystin.

We understand, and as you heard this morning, there are many different variants of microcystin, many different types of cyanobacteria that, frankly, we know very little, if not anything, about. Not just in terms of the nature of those, but also of the potential toxicity of those. So as we applaud the work that is advancing currently, we also would recommend, and not want to lose sight of the fact that there are many other variants of microcystin and cyanobacterias that are not being studied that need additional study.

Mr. SHIMKUS. And it is to no one's surprise that I am from one of the largest agricultural districts in the Nation, and I know that good stewardship is important to them, filter strips, and now with incoming technology, the ability to really—I think a lot of people have a perspective that this stuff just gets sprayed, to the point where it just runs off. And new technology is available where they are going to be implementing either the herbicide, or the fertilizer, like, right—almost specifically right upon the seed. So have you had discussions with the agricultural community in—some of these issues in dealing with the State of Ohio?

Mr. BUTLER. Yes, Mr. Chairman. I think—one thing I just wanted to make clear, as we—since 2010, through Toledo, and then continuing, this has been an issue that Governor Kasich has been active in, and we all have been. As I mentioned, we have a very close partnership with the Departments of Agriculture and Natural Resources through the non-point source programs in Ohio, as well as Ohio EPA and the Department of Health, so we have continued to meet and work aggressively on this.

One of the things that we had been working with is with the agricultural community, the Farm Bureau in Ohio and agribusiness. They have implemented some programs. They have a healthy water initiative through the Farm Bureau, where they are doing a 20 to 30 year assessment. They have also invested several million dollars about—doing edge of field research, looking at transport of nutrients off of the fields and how that happens. We have recently been working with—through the monies that we received through the Great Lakes Restoration Initiative, we have been working to implement several programs of—in the ag community, including cover crops, making grants available for farmers to do cover crops.

But as you mentioned, the prescription application, the prescriptive—very precise, targeted implementation, we know that, much

like no-till farming was many years ago, that equipment was very expensive. Farmers weren't used to—know how to use it. I think we are in that same phase now. There is very expensive equipment that farmers can use to be very targeted in the application of fertilizer through GPS, other technologies, and think they are very willing to use it. It is just, how do we train them to do that, and then help them purchase the equipment to do it?

Mr. SHIMKUS. And I think one of the aspects will be immeasurable. How do you measure the success of the new techniques, and new farm activities, and get credit for the great work that is being done in that area?

Mr. Donahue, cyanobacteria blooms, as I understand them, are not a new problem. To what do you attribute more frequently observation and reporting in most recent years?

Mr. DONAHUE. Thank you, Mr. Chairman. I would say that for public water systems, we do see more frequency in these algal blooms in our receiving streams. Many more public water supplies are using surface water supplies as their source of drinking water, especially in the Midwest, as we have seen groundwater systems be depleted.

Certainly the increase in nutrient runoff has had an impact on our—the quality of our source water, and, from that perspective, I think a relationship, or a partnership between the Safe Drinking Water Act and the Clean Water Act, in order to help us better understand how those—how that bacteria occurs in the receiving streams, and, ultimately, what we can do to prevent it from getting into our drinking water supply is something we should be looking at.

Mr. SHIMKUS. Thank you. There have been a lot of concerns coming out of the Toledo experience on monitoring and testing procedures and equipment. Could you please speak to the feasibility and reliability of the available methods for detection and treatment, and also speak to the viability of—and the affordability of these?

Mr. DONAHUE. As far as the analytical processes, I am not an expert in the analytical procedures. I do know that there is some additional work needing to be done, as far as standard method for the analysis of drinking water for cyanobacteria. Regarding the cost for public water supplies, certainly drinking water is an undervalued commodity today. We spend a lot of money—our customers believe that they have a—the cost of their water supply——

Mr. SHIMKUS. You are choosing your words carefully.

Mr. DONAHUE. I am trying to. So water is undervalued to the point where somebody would pay $2.50 for a cup of Starbucks coffee, but they might squawk at paying the same amount of money for a 1,000 gallons of safe drinking water delivered right to their tap. So could some public water supplies afford to increase their rates? Perhaps. But our position is that, in this case, it would be a bit unfair to put all of the burden on the public water supplies in this case without looking at the sources of the cyanobacteria in the first place.

Mr. SHIMKUS. Thank you. My time is far expired, and I apologize. Now turn to the Ranking Member, Mr. Tonko, for 5 minutes.

Mr. TONKO. Thank you, Mr. Chair. Mr. Donahue, you indicated in your testimony that tackling this problem at the treatment plant

is not sufficient. Does the American Water Works Association support efforts to protect source water by eliminating nutrient inputs to drinking water sources?

Mr. DONAHUE. We absolutely support anything that can be done to prevent these nutrients from running off into our receiving waters. I think what I said in my testimony, though, is that the treatment processes are available that could remove cyanobacteria from the drinking water, but they are very expensive to acquire and maintain. Requiring communities to purchase advance drinking water technology and implement it without doing something at the source water level, we believe, would be a bit unfair.

Mr. TONKO. Yes. And what are the costs to water utilities to adequately treat water to remove toxins from the algal blooms?

Mr. DONAHUE. I don't have that information available to me this morning, but we would be happy to provide you with that at a future date.

Mr. TONKO. And we have heard that small and seasonal streams and wetlands play a critical role in source water protection. That is the goal of the EPA/U.S. Army Corps proposal, to clarify the definition of waters of the U.S. Ms. Thorp, is the protection of these upstream waters and wetlands important for pollution reduction and to control harmful algal blooms?

Ms. THORP. Thank you, Ranking Member Tonko. Yes, indeed, it is. EPA has found, in its scientific analysis accompanying the proposed definition, that streams and wetlands play a critical role in nutrient reduction. In fact, I believe they found the—scientific literature over the last several decades replete with evidence of this pollution filtering role.

Mr. TONKO. Yes. And according to EPA, drinking water for over 117 million people comes from public water systems that rely, to some degree, on seasonal streams. And so, Ms. Thorp, if we do not protect the feeder creeks and upstream waters, is there an impact on drinking water quality for these communities?

Ms. THORP. Thank you. Yes, sir, we think so, and we think that number is a low estimate, because that was based on an analysis only of headwater streams and the public water systems that serve what—about a third of our population. But, of course, the impact of streams and wetlands, and their role in filtering pollution, including nutrient pollution, is much broader than that. It includes many people relying on private wells, for example.

Mr. TONKO. Yes. And, Mr. Donahue, if we don't do more to protect source waters, what does that mean for water utilities and their customers?

Mr. DONAHUE. Well, certainly that if we don't do something to remove nutrients from source water before it gets to the drinking water treatment plant, treatment facilities will have no choice but to impose treatment techniques that would remove those potential contaminants. Our first priority is to protect public health, and if we can't control that on the source side, then drinking water utilities will have no alternative but to increase their treatment capability, and the cost associated with that would be transferred to our customers.

Mr. TONKO. You know, I hear about the seriousness of this issue, and the toxicity that impacts society in general. Perhaps the mis-

understood status of the regulatory opportunities under the Clean Water Act. We are also compounding the situation with climate change, a science that oftentimes is ignored.

Some of the predictions for climate change impacts are for far more extreme weather events, and altered weather patterns. This might include more intense rainfall events, which—obviously cause for additional washing of these nutrients into the system of toxic elements, warmer summers, higher temperatures obviously being an impact here, longer droughts, for example. Ms. Thorp, what impact would these changes have on harmful algal blooms?

Ms. THORP. Thank you, sir. I think a number of impacts of extreme weather events and warming temperatures can affect the problems we are talking about here. One example is that the growth of harmful algal blooms, and, in fact, all algal blooms, is not completely understood, as we have heard earlier today, but we know that warming temperatures, as well as rainfall patters, can affect that growth. We also know that excessive rainfall, for example, can lead to increased nutrient runoff, which then is feeding the problem in another way.

Mr. TONKO. Yes. Mr. Donahue, were you looking at that, that——

Mr. DONAHUE. No.

Mr. TONKO. OK. All right. With that, I yield back.

Mr. SHIMKUS. Gentleman yields back his time, and the Chair now recognizes the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. LATTA. Well, thanks again, Mr. Chairman, and thanks again for having our hearing, and thanks to our panel for being with us today. Really appreciate your time and expertise in this matter. And if I could—Director Butler, if I could ask you some questions right off the bat?

It was mentioned a little bit earlier that there are several types of cyanotoxins of concerns just besides the microcystins. Do you believe it would be helpful if the U.S. EPA had a comprehensive list of cyanotoxins determined to be harmful to human health in drinking water?

Mr. BUTLER. Mr. Chairman, Representative Latta, yes, we do. We know that that would take a long term commitment from U.S. EPA, and take an extensive period of time to do that, particularly if they were to develop regulatory levels about the harmful impacts for that. We are encouraged by the acceleration to provide states with some additional information and health advisory in 2015.

We think that will add to the body of research that is out there, although we think that we need to continue to accelerate, keep our foot on the gas, so to speak, about not only moving through 2018 with—moving with a regulatory level, not only for those that U.S. EPA had identified, but also do not forget about the other cyanobacteria and harmful algal derivatives that are out there that also need attention.

Mr. LATTA. And also, you know, all the conversations we had during that first week of August, you know, when Toledo was having its crisis out there, in all that was going on, I know that—you mentioned what the state has done, especially on funding from the U.S.—or from the Ohio EPA. Because of the cost—because there was a significant amount of dollars here, when we are talking

about the different types of testing that are going to be going—that could be done—and if you could just maybe go into all of it? Because I know that we are talking about, you know, the Elisa Method, and the LC–MS/MS test method that is being—that is more robust and efficient than the others, and being able to find different variants.

But if you could just kind of go into that, because I found it pretty interesting, number one, the cost, two, about getting the equipment, and three, about finding the personnel, being able to just run that equipment. And then, again, I think, in the north end of Ohio we have about 140 plus systems out there that are utilizing surface water, and what that would entail for all of those communities. I know that is a long question.

Mr. BUTLER. Mr. Chairman, Representative Latta, exactly right. We have made a million dollars, as I mentioned in my testimony, I think we have 125 systems that are surface water systems in the State of Ohio, many of those which take water directly from Lake Erie. We came to that relative number of a million dollars because we wanted to offer this Elisa screening technology to all of them. That cost of doing that is about $10,000, so a relatively modest amount of money.

What you get from that, in my layman's terms, is you get a piece of technology that is a broad spectrum identifier, if you have microcystin in your water. It is not a piece of technology that helps speciate out which protective variant or congeners you have, or what kind of cyanobacteria you have got. If it is in there, it will tell you it is there, but it won't tell you which one it is, and it won't tell you whether it is one of those that may be harmful, or which ones it may not be.

So we think it is a great screening tool, and we think that a tiered approach would be most effective. If we are going to move into a more detailed system, and you talked about the LC–MS/MS technology, Dr. Grevatt could tell you what all of that acronym means, but, in my view, what it will do is a much more refined testing methodology that gets down and helps you identify what variant of cyanobacteria do you have, and whether or not it may be one that is harmful. That is also helpful. If you could use that as the Elisa Method to determine whether you have something to be concerned with, then you could rely on the LC–MS/MS technology to then figure out exactly what variant you have go hand in hand. The issue we have with the LC–MS/MS is—or the HPLC, which is another, is cost.

Rather than $10,000 for a piece of equipment of Elisa that a small community could run, and learn that very quickly, the cost to us in the State of Ohio would be around $400,000 for one piece of equipment. On top of that, you have the development of the method, which could take many months, 8 to 12 months to find the method. And then, for us, it is a cost concern about just finding somebody that is capable of running it. It is a very specialized piece of equipment. Having somebody with the right degree and credential to be able to keep them on staff and pay them, frankly, a state salary is very difficult. So while we like that technology, we also don't want to suggest that that be the only potential technology we use.

Mr. LATTA. If I could just follow up just briefly? With that, how many communities could utilize one piece of equipment?

Mr. BUTLER. Mr. Chairman, Representative Latta, that is a good question. We have talked internally, and with U.S. EPA, about whether the State of Ohio or communities could group together. I think they could all—and we are seeing that happen now, frankly. Some communities do not want to take the grant monies from Ohio EPA, even for the $10,000 for the Elisa technology, because they are very close to another small neighborhood that is, or has the technology. They are partnering together, sharing services, which we very much applaud in the state. Sharing those services, banding together, and doing the testing.

So it is conceivable, and we would encourage it, that there would be a way for many communities to band together and use an HPLC methodology. We could also help them, through our testing capabilities with the State of Ohio. I know U.S. EPA has this, as well as many universities too, so there are multiple options, so not every community would need to invest that time and money.

Mr. LATTA. Thank you. Mr. Chairman, I appreciate your indulgence in time, and I yield back.

Mr. SHIMKUS. Gentleman's time has expired. Chair now recognize the gentleman from Mississippi, Mr. Harper, who will be the vice-chair of this subcommittee in the next Congress. We want to congratulate him on that, and you are recognized for 5 minutes.

Mr. HARPER. Thank you, Mr. Chair, and I want to thank the Chairman, and look forward to the next term, and I hope you will be pleased with that decision, so thank you. And glad to have the panelists here today, appreciate this. This is an important topic, important to many of us. And if I could start with Mr. Butler?

And what is your expectation of how U.S. EPA should engage with the states before issuing its public health advisory?

Mr. BUTLER. Mr. Chairman, Representative Harper, that is a great question. What we have been encouraged by so far is the great working relationship we have got. We are very blessed to have the Office of Research and Development in Cincinnati. So them being able to help us in the Toledo situation was very helpful. In fact, we were flying samples down in the middle of the night, and their staff, you know, went to the airport to pick these samples up in the middle of the night, so it was just a great opportunity for us. We have been encouraged since then. We have got a great working relationship.

And to answer your question directly, what we would prefer, and what we would like to see happen, is, as U.S. EPA—and we know they are on a very fast track to get us this health advisory information, but as they are going through this process to engage states that are interested, or that need to be engaged in the development of that, rather than at the end, after they develop that, hold a public hearing and public comment period. So I know it is a balance. We want to see this move along quickly and get the information, but we would prefer to be engaged up front, because we think we have information to offer.

Mr. HARPER. And if I may ask, Mr. Butler, since the algal problem in Toledo, is the Ohio EPA on much better ground regarding testing protocols for microcystin?

Mr. BUTLER. Mr. Chairman, Representative, I think we are. You know, we have learned a lot after working with Toledo. We also have worked with all of our other surface water systems, not only in terms of offering technology and treatment, but we have developed, and have redefined, and continue to redefine on a consensus basis, with all of our surface water systems, statement of operations on how we—everybody consistently manages tests for cyanobacteria.

Mr. HARPER. You know, I am very pleased with your earlier comments on the coordination between the Ohio EPA and U.S. EPA of what you went through, and the——

Mr. BUTLER. Yes.

Mr. HARPER [continuing]. That coordination that took place. But if we were looking overall, what improvements to government coordination between the states and Federal Government would recommend would need to occur, and why?

Mr. BUTLER. Very specifically, and I will just reiterate a comment I had before, as we focus more attention, and U.S. EPA is starting to aggressively develop not only health assessments, but further on, with potential regulatory limits in safe drinking water, through the contaminant rule, I think that coordinating more up front versus more reactive is something we would encourage, and think it ultimately leads us to a better product. I think we get there quicker, and I think U.S. EPA would concur with that. So it is not a fault, but I just think a process that would allow that would be much more beneficial.

Mr. HARPER. And, Mr. Donahue, if you can just kind of educate me a little bit, and those that are tuning in, discuss effective ways to treat drinking water for the cyanotoxins.

Mr. DONAHUE. Thank you, Congressman. Yes, typically, conventional coagulation and sedimentation can take care of this. There are a number of other treatment technologies that are able to remove cyanotoxins from the water. Pre-treatment oxidation, and even microfiltration with membrane treatment are all options for treating drinking water.

Mr. HARPER. OK. Some of our testimony today talks about predicting cyanobacteria blooms through National Oceanic and Atmospheric Administration modeling. Can you please speak to the challenges of relying on this too much?

Mr. DONAHUE. I really don't have the answer for that question right now, but we would be happy to provide that.

Mr. HARPER. Anybody else on the panel want to take a shot at that? OK.

Mr. BUTLER. Well, Representative, what we are encouraged by is NOAA continues to refine their modeling, and being able to provide more and more specialized assessments in the western basin, we also are working with our aviation centers in Ohio in how we can coordinate with NOAA, and even NASA, on being able to provide more detailed information about looking at the western basin almost in real time, in a very specific location. The caution would be not to rely on that completely, because you may not always find that those are if we have a harmful algal bloom, that those are visible from the surface, or from a multi-spectrum scanner.

So the need to do consistent sampling, and we do that in the near shore environment around the western basin, Ohio EPA and others do sampling to give us a predictor of when those harmful algal blooms may be in place.

Mr. HARPER. Thank you, Mr. Chairman, and I yield back.

Mr. SHIMKUS. Gentleman yields back his time. Chair now recognize the gentleman from West Virginia, Mr. McKinley, for 5 minutes.

Mr. MCKINLEY. Yes, thank you, Mr. Chairman. At the conclusion of Grevatt's comment, and I think the Chairman mentioned it, and then I think, Mr. Donahue, you mention it as well, and that is the State Revolving Fund, I want to get back to that in a minute, but I thought I heard you say in your testimony that there were some 4,500 water treatment facilities in the State of Ohio. Is that accurate?

Mr. DONAHUE. That is correct, sir.

Mr. MCKINLEY. And so we are now—and I don't know how many of that would be across the country. Yes, if there are 4,500 in the State of Ohio, I don't know, how many water treatment facilities would we have across the country? Thousands?

Mr. SHIMKUS. You may want to direct that to Mr. Donahue, David.

Mr. MCKINLEY. Yes.

Mr. DONAHUE. Drinking water treatment facilities, there are in the neighborhood of 50 to 55,000 treatment——

Mr. MCKINLEY. OK.

Mr. DONAHUE [continuing]. Facilities——

Mr. MCKINLEY. But not all of them are going to be surface water——

Mr. DONAHUE. No.

Mr. MCKINLEY [continuing]. But I think we are primarily focused back on the State Revolving Fund, we have had people come before us in this panel, and other committees, where they have talked about—the State Revolving Fund doesn't have an adequate amount of money to meet all of their challenges that they have. And perhaps this is—this situation—I am not denying it is happening. I think we have to deal with that, and it is just going to exacerbate the problem all the more if there is not sufficient money with the SRF. Would you agree with that?

Mr. DONAHUE. Absolutely. There is significant competition for SRF funding right now. AWWA has produced a report that has identified more than a trillion dollars' worth of infrastructure requirements for the country in the next 20 years, and that alone can tax the SRF program. And this would only serve to make that matter worse.

Mr. MCKINLEY. Well, thank you, because I am concerned, as I mentioned in my earlier remarks at the last panel, where those small communities, 4,500—how they are going to come up with the money, and there has to be a grant to be able to help them out to do this. And if the SRF doesn't have sufficient funds, it just exacerbates this problem all the more.

So, having said all that, I am curious, and probably should have asked Grevatt when he was here, why would the EPA reduce funding for the SRF? The president just came out with his budget, re-

duces the State Revolving Fund by nearly 40 percent. And when we asked them that question, why did they reduce it, knowing so many people in these small communities need the money, why would they do that? And his—and her answer was, we have changed our priorities. Our priorities are not State—providing money for communities for water systems, but rather for climate change initiatives, pamphlets, literature, and education processes around the country, and perhaps around the world.

How would you—in terms of priorities, OK, would it be better to be able to provide money for the—these communities that need water, clean water? Because we have all talked about how desperately we need it. Or is it more important that we have climate change initiatives?

Mr. DONAHUE. Certainly, Congressman. Maintaining the SRF program, and even increasing it, is something that the American Water Works Association fully supports. Many of our small, medium, and large communities rely quite heavily on the revolving loan funds to support capital projects within their community.

Mr. MCKINLEY. So you would have a problem with transferring $581 million out of the State Revolving Fund?

Mr. DONAHUE. I am not sure I am the best person on this panel to answer that question, and Dr. Grevatt is still here, but I would say yes.

Mr. MCKINLEY. Thank you. I yield back the balance of my time.

Mr. SHIMKUS. Gentleman yields back his time. Looking to the minority side, Mr. Barrow waives. Chair recognizes the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman, and thank you to the panel members for joining us today. Mr. Butler, it is good to see some home folks here today from Ohio.

Mr. BUTLER. Yes, sir.

Mr. JOHNSON. Good to have you.

Mr. BUTLER. Thank you.

Mr. JOHNSON. Mr. Butler, does Ohio EPA support the U.S. EPA issuing a non-contaminating monitoring rule for microcystins?

Mr. BUTLER. Mr. Chairman, Representative Johnson, yes, we do?

Mr. JOHNSON. You do?

Mr. BUTLER. Yes.

Mr. JOHNSON. OK. How is Ohio dealing with nutrient contribution to source water from non-agricultural contributors?

Mr. BUTLER. Mr. Chairman, Representative, that is a good question. As I mentioned in my testimony, some of the immediate after action items that we did was—we were able to secure some money from U.S. EPA. You have often heard, in our state, people talking about how Grand Lake St. Mary's was called a watershed in distress, and there has been a call for calling the western basin of Lake Erie a watershed in distress. While we think this is important, and that is a designation that we see as useful in a grand lake, it is not something that we agree with for the western basin, and the reason is it is only focused on agricultural sources. There are many contributing sources in the western basin that are non-agricultural.

We have used the money that was provided by U.S. EPA by the GLRI to go down into the very small sub-watershed levels, use the

information we have through our monitoring and sampling that worked throughout the state, and in the western basin, to determine if it is an agricultural contribution that is most predominant, if it is point source, or other non-point source, in many parts of our state we have failing not—failing on-lot septic sewage systems. It is generally a combination of all those. No watershed is the same. So we have been able to use that money to target and develop—I call it a prescription for each one of these very small sub-watersheds. That is much more productive, than—it is just a broad brushed approach.

Certainly agriculture recognizes that they have a contribution, and they are—they have, and we agree, that they have stepped up to help us here. But there are other sources that we are also working on. We have introduced two pieces of—we are going through our end of the year legislative session. In House Bill 490 we have recently added two components. One is adding monitoring, a requirement that all of our wastewater treatment plants would include monitoring for phosphorous, so we can determine if they are contributing, and then manage that. And the second is we introduced part—a bill that would disallow, unless under certain conditions, the open lake disposal of dredge material on Lake Erie, which is also thought to be a contributor for harmful algal blooms.

We have also—on the agriculture side, we have worked a lot through Senate Bill 150 that was implemented, on training all the farmers to make sure that they are certified on application of manure. And we have also done cover crop work. We have done soil testing. And so we have got a comprehensive program across the board.

Mr. JOHNSON. OK. Well, thank you. I understand that some groups in Ohio have a citizen sampling program for dealing with microcystin. Are the groups operating in Toledo working with Ohio EPA?

Mr. BUTLER. I have heard that the groups exist. It is not to my knowledge they have worked with us.

Mr. JOHNSON. OK. Does Ohio EPA have a citizen sampling program?

Mr. BUTLER. We have a program called Credible Data, so whether it is Ohio EPA—we have got a lot of scientists that are out in the field collecting water quality data. We will accept, under certain conditions, if they, you know, if citizens or other organizations collect samples, we can accept those, as long as they follow the proper chains of custody, and that the samples are accurate samples. We have not only guidance in Ohio, but law in Ohio that directs how we do that, and we are willing to train people to do that.

Mr. JOHNSON. OK. Well, you mentioned chain of custody. How important is chain of custody, and using approved methods when sampling is occurring?

Mr. BUTLER. It is crucial. We base all of our decisions based on science, and the legality of those results. So having a complete chain of custody from the time the sample is taken, knowing how those samples were taken, what parameters they are taken, make sure they are taken under the right methods, they are preserved correctly, that those samples then are handled correctly for certain periods of time. Some call for icing of those samples, some don't.

So the whole chain of custody, and how those samples are managed to get them to our laboratory, to get them through our testing methodology, is critical. And if it is not done the right way, it calls into question the result.

Mr. JOHNSON. OK. Well, thank you very much. Mr. Chairman, I yield back.

Mr. SHIMKUS. Gentleman yields back his time. I would be remiss if I didn't also mention the USDA Rural Development ability to access water assistance for small rural Americans. It has been very, very helpful, and I can't say enough about it. Based upon the agreement between the majority and minority committee staff, I would like to request unanimous consent that the letters from the following organizations, as well as their attachments, be inserted into the hearing record. The Association of State Water Drinking Administrators, the Internal Bottled Water Association, the Fertilizer Institute, the American Municipal Water Association. Without objection, so ordered.

[The information appears at the conclusion of the hearing.]

Mr. SHIMKUS. I would also like to request unanimous consent that members have 5 legislative days to submit statements for the record. And, with that, I want to thank you for coming. I think it was very helpful and educational. I look forward to working with you, and the hearing is adjourned.

[Whereupon, at 11:41 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

PREPARED STATEMENT OF HON. FRED UPTON

I want to thank the Chairman of the subcommittee for recognizing me.

Today, this panel is going to examine the issue of blue-green algae in the water which is treated for use in Americans' drinking water taps.

As we've already heard, this past August, in an effort to protect its customers from elevated levels of algae toxins in the water, the City of Toledo, Ohio urged all customers of its Collins Water Treatment Plant to neither drink nor boil its treated tap water until an "all clear" was issued.

This protective effort though was little comfort for some who were confused about what the "DO NOT USE" order meant and were anxious about the adverse health impacts that exposure to cyanotoxins (CY-AHN-O-toxins) could inflict: damage to the liver, skin, or nervous system. In addition, cyanotoxins (CY-AHN-O-toxins) were known to inflict death upon exposed wildlife, livestock, birds, and pets.

Toledo is not a one-off when it comes to harmful algal blooms in fresh water that is used as a source drinking water. While I am not aware of any cyanotoxins (CY-AHN-O-toxin) issues with Lake Michigan, the Toledo incident did have fellow Michiganders in Monroe County on alert as well.

Cyanobacteria (CY-AHN-O-bacteria), the microorganisms considered as important contributors to the formation of the Earth's atmosphere and need for nitrogen are also frequently connected to harmful algal blooms, technically known as cyanotoxins (CY-AHN-O-toxins).

Cyanobacterial blooms usually occur according to a combination of environmental factors e.g., nutrient concentration, water temperature, light intensity, salinity, water movement, stagnation and residence time, as well as several other variables. Consequently, when cyanobacterial blooms occur in drinking water resources, treatment has to remove both cyanobacteria (avoiding cell lysis and subsequent toxin release) and aqueous cyanotoxins previously released.

As the subcommittee chairman said, this is a highly complex issue which is national in scope, but only gained national attention a few months ago. The Association of State Drinking Water Administrators reports that nine states have created programs, developed health thresholds, or enacted policies and protocols for sampling and issuing public notices on harmful algal blooms.

There are many types of blue-green algae and the diversity of their habitats make it complicated to predict the precise conditions favoring their growth. Physical fac-

tors that affect whether harmful algal blooms grow include available light, weather conditions, water flow, temperature, and mixing within the water column. Chemical factors include pH and nutrient (primarily nitrogen and phosphorus) concentrations.

I appreciate that our subcommittee is going to get a better understanding of this issue, particularly from both Federal and state regulators, who worked so hard to get this issue under control late this past summer.

I also want to commend Mr. Latta for his dogged attention to this matter.

Our committee is but a piece of the cyanobacteria and toxin puzzle, but an important one for anyone who drinks finished water from a utility. I look forward to the testimony of our witnesses.

I yield back the balance of my time.

PREPARED STATEMENT OF HON. HENRY A. WAXMAN

Today's hearing focuses on a growing public health threat, cyanotoxins in drinking water. Harmful algal blooms can grow out of control in our nation's waterways, posing risks to those who drink, swim, or even fish in contaminated water. If these blooms are blue-green algae, also called cyanobacteria, they produce toxins called cyanotoxins.

Cyanotoxins can cause a long list of health impacts: liver damage, skin and eye irritation, gastrointestinal illness, neurological effects, cancer, paralysis and death. And exposure to these toxins can occur through direct contact, drinking contaminated water, consumption of contaminated fish, and inhalation of aerosolized toxins.

Every year, toxins released from algal blooms prompt seasonal closures of shellfisheries around the Pacific, Gulf, and Atlantic coasts in the United States.

The toxins are also a serious issue in the Great Lakes. This year, the toxins forced the closure of a major drinking water system, leaving 500,000 people in the city of Toledo unable to use their tap water for two days. The water was not safe, even for bathing, and boiling it would do nothing to remove the toxins.

There are important steps Congress should be taking to address this threat. We need to provide more resources to EPA. EPA doesn't have the resources it needs to monitor the extent of the contamination, develop health advisories and drinking water standards, or provide technical assistance to states and drinking water systems.

We also need to reauthorize the State Revolving Fund to get resources to affected utilities. And we should speed research into testing methods and treatment techniques. But we must also address the root causes of these algal blooms, and one of them is climate change.

Water temperature is a key factor in the growth of harmful algal blooms, and climate change has already lengthened the bloom season. Warming waters, elevated carbon dioxide levels, and acidification all provide a competitive advantage to harmful algae over other organisms, leading to greater frequency and intensity of blooms.

Climate change has also increased extreme weather events, which create favorable conditions for algal blooms. Heavy precipitation and flooding increase nutrient runoff and pollution. In droughts, lower water levels can concentrate nutrients and allow them to stay in the water longer, enhancing the conditions favorable to algal growth. Droughts have also increased salinity in freshwater ecosystems, allowing toxic marine algae to move to inlands waters.

A recent report by Smithsonian researchers found that climate change has exacerbated the harmful algal bloom problem—in fact, they found that the effect of climate change on harmful algal blooms has been grossly underestimated.

Our first step must be to stop denying the facts and to stop underestimating the impacts of climate change. It may be politically convenient to deny climate change is real. Science deniers don't have to cut emissions or make hard choices. And they don't have to take on the biggest polluters in the country, whose efforts to sow confusion and doubt have been determined, sophisticated, and well-funded.

But denying climate change is irresponsible and reckless. We have a window in which we can act. If we don't act, algal blooms and so many other problems caused by climate change will grow worse.

And history will look back at this Congress with shame and embarrassment and ask why we failed to heed the warnings of scientists.

PREPARED STATEMENT OF HON. MARCY KAPTUR

When I was first elected to Congress, there were two pairs of nesting bald eagles left on Lake Erie. Our nation's symbol was an endangered species. Yet, due to passage of the Clean Water Act, a decade earlier in 1972, the banning of DDT, and the vigilant efforts of citizen naturalists and environmentalists near and far, today there are over 200 pair of nesting eagles on Lake Erie. Our efforts to restore our wildlife refuges and natural habitats, as the decades have ensued, are paying off.

This year over 300 eaglet chicks hatched. The bald eagle has been taken off the endangered species list.

Indeed, about 2 years ago, a pair of adventuresome bald eagles took flight from our western basin, flew east, and established a nesting site in the Cuyahoga Valley National Park. Literally, Lake Erie's Western Basin has given rebirth to the bald eagle across our region.

This giant accomplishment of human beings helping nature restore herself teaches us that America can achieve what she sets out to do.

Our place here in Lake Erie's Western Basin is truly blessed. Nowhere on the face of the globe does this much freshwater meet this much arable land. Nowhere. This rich land, site of the former Great Black Swamp, formed as Lake Erie's glacial waters receded from as far west as Ft. Wayne, giving rise to a productive life bowl that even hosts our community's mascot - the Mud Hen - a little brown duck called the "coot."

This freshwater kingdom and the land around it was tiled and drained for agriculture. The fields are abundant and our 4-season region is sustainable. The highly productive soils of Providence Township and points west, south, and east of it are precious, surely in a world whose population is slated to expand geometrically, at a faster and faster rate. When I was born, our nation's population was 146 million. In half a century, it has doubled to over 300 million. And, in even less time, by 2050, it is projected to rise to 500 million people - a population two and a half times as large as in the post WWII years.

Agricultural innovation and pushing the science of production has made it possible to meet our food supply needs and to export to a hungry world, especially those in less productive regions. Fertilizer levels have been quadrupled in the past quarter century to replenish depleted soils for higher yields and double cropping. Fertilizer composition has been altered, sometimes eliminating ingredients like sulfur that play a role in soil and water health. Sulfur helps break down phosphorus, one of the nutrients that explode algae's growth.

But one natural resource on the face of the earth cannot be magically increased - and that is fresh water. There is a finite amount, and though its form gets changed and shifted around by the seasons, its quantity remains the same globally.

In an era where other regions are experiencing water shortages, the Great Lakes contain 85 percent of the freshwater in the United States and 20 percent of the world's supply.

On a planet where there are increasing calls by humans and animals for fresh water, it behooves us to stop and consider how our precious waters and arable soils can be managed for the sake of future generations. The stresses on our waters are growing and significant.

We need clean water and we need replenished soils. We can't afford to destroy either for the sake of the 11 million people who live here and generations to follow.

In Toledo, the taps are back on, but the water crisis continues. Our water is drinkable again, but the emergency still exists.

The toxic algae threat has receded for the moment, but the image of our community has suffered untold, tremendous damage.

Rainfall across our region has changed. Sudden, extreme downpours are more and more common, increasing the nutrient runoff into streams and rivers. Our climactic zone has moved up a zone. Ohio's climate is now like Tennessee's. In a nation where 17 states in the arid, fire ravaged West are facing scarcity, we are dealing with a different sort of dilemma.

There is the reality that Lake Erie is sick again - very sick. It might even go the way of Grand Lake Saint Mary's, the western Ohio watershed that is in grave trouble. Lake Erie already has dead zones. No one in this region and frankly, no one with any sense can look the other way.

This resource is too important - and, this is our home. We have to muster the will and intelligence to help this system heal.

We don't need another study. Legislative work I have done in funding the Western Lake Erie Basin Partnership for a decade and a half. This group has laid the research foundation for action. We have a major environmental crisis on our hands.

The Toledo water drinking water advisory was an important warning that we overlook at our own peril.

Let me take you on a journey across our Watershed, the largest in the entire Great Lakes. Put on your hip boots. We are about to scale a shallow canyon that tilts eastward. Toledo lies at the base of this oblong bowl on its extreme eastern edge.

Simply put, the water drains toward us across a three state region. For example, when Findlay floods, Lake Erie eventually becomes the depository for the runoff as the Blanchard River runs North. If you picture the Watershed as a living, beating heart, the Maumee River is its major aorta. That aorta is fed by major veins and smaller capillaries that form ditches, streams, and rivers that drain into the Maumee inside this bowl tilted toward the Lake. Waterways drain downward from Michigan, - eastward from Ft. Wayne, Indiana - northward from a region south of Findlay - and upward and across toward the Lake near Sandusky.

The watershed is a sponge of water, including artesian wells, underground rivers, and a spider-web of subsurface drainage tiles.

That manmade, concentrated subsurface drainage system is the most concentrated system of tiling on our continent. When it rains anywhere across the watershed, this system acts like a superhighway - shooting the runoff into the Lake.

Now remember rainfall in the Midwest has increased by well over a third in the past quarter century.

The toxin that invaded Toledo's water system is the end product of a massive watershed runoff problem. Just fixing Toledo's water plant won't fix the watershed problem. We have to fix the tri-state feeder system that is clogging the arteries of our heart and threatening cardiac arrest in our Lake.

Our tri-state watershed embraces 11,111 square miles - larger than the states of Maryland and Delaware combined or a land area a little larger than ′ of Ohio.

When water moves inside this watershed, it sweeps up with it natural sediments and nutrients from the land, and all the by-products of human activity - sewage, stormwater runoff, industrial runoff and agricultural runoff, including animal waste and commercial fertilizer, a witch's brew of our own making.

The water drains and courses down the Maumee River - the largest river that flows into the Great Lakes - and eventually delivers massive amounts of nutrients into the shallowest, warmest and most fragile of the Great Lakes. The Detroit River and Thames River in Ontario also charge nutrients into Lake Erie; but our watershed is the biggest contributor.

Toxic algal bloom and other water contaminants have become a global health threat and an enormously expensive treatment challenge for cities throughout our country. Fixing this is a multi-billion dollar challenge; not just a few million.

To succeed, the region will need a financing mechanism that embraces the entire watershed and meets its myriad of challenges, from thousands of leaking septic systems, to urban storm runoff, to 2 dozen combined sewer overflows, to animal manure spread on winter snows. And, as we found out in Toledo, the clock is ticking.

Good science can save Lake Erie and our freshwater supply. That is why I have worked so hard to bring precious Federal dollars starting nearly three decades ago to launch the Lake Erie Research Center at the University of Toledo, in memory of Dr. Peter Fraleigh, a pioneer in lake science who predicted that this day would come. If you haven't visited this world-class Center near Maumee Bay State Park, you should.

We need to strengthen our lakefront science capabilities so that the Lake Erie Center, and Stone Lab at Gibraltar Island and the water labs at Heidelberg and the Erie County Health Department can refine the science of our Lake. We must continue our work with NASA, and the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, and the Natural Resource Conservation Service of the United States Department of Agriculture. We need them all to help us, not just during this crisis, but to lay the basis for additional action.

To effectively embrace the magnitude of what it will take to heal Lake Erie is precisely why I have worked hard to create a tri- state collaboration called the Western Lake Erie Basin Partnership. It was designed originally as a voluntary effort and a national model for watershed management in this 21st century - a century in which pundits observe freshwater will become more precious, even with wars fought over access to it.

My initial goal was to legally protect our water supply and to prevent its diversion from this region. Our challenge now is to build forward a more action-oriented organization to achieve a solution to the ecosystem crisis at hand. Thank goodness the vision, the science, and the relationships already have been at work across the watershed.

As the ranking Democrat on the House Energy and Water Subcommittee, I have proposed several legislative alternatives to expedite a solution to cleaning up the waters and, frankly the soils, to ensure public health and safety. The solutions that will work must rely on three pillars; science, citizen action, and an aggressive, accountable management structure.

The first immediate step is to strengthen the science. USEPA should be mandated to provide advisory guidance for testing and treating microcystin in our drinking water. We need a standard and we need universal testing protocols for this contaminant.

Second, our Lake Erie labs need the testing equipment and research capabilities to help us and all Lakefront communities to maintain a safe drinking water supply. Communities along Lake Erie should not be forced to waste 2 days in transporting samples to labs in southern Ohio or other states for certified results during a crisis. Lake Erie is here, and so should the labs be here.

Third, we need to inspire a "watershed mindset" across our entire basin. This is an awesome task. To be successful, an active and engaged public across the watershed is essential.

We have 1,313,420 acres to attend to. The storm sewer on the street can become a filter strip for nutrient runoff with proper rain-garden plantings. For farmers out in the country, their drainage ditches can become catchment ponds for nutrients that can be reapplied to fields. The vast amounts of animal manure produced across the watershed need more careful management and, frankly economic uses whose value exceeds the savings of field application.

Let me just pick out a few numbers to illustrate the magnitude of the nutrients our watershed is asked to process each year. When it fails to do so, the residuals end up in our Lake and royally feed the algal blooms.

There are two million people who live in our watershed; but over nine and a half million animals live here too. The amount of human fertilizer generated each year would fill 247 boxcars. But for animal manure, which totals over 12 billion pounds annually, it would take 42,713 box cars to haul it out. That's over 170 times more than humans.

For commercial fertilizer, there are a total of over a billion pounds of nitrogen, phosphorus and potassium placed on the land, or 3,745 boxcars full. The question is how much do the plants absorb, and how much material works its way to Lake Erie.

There is an old expression; "you can't fool Mother Nature." And, I would add - we shouldn't try. We must find the truth and face it resolutely.

Finally, I believe that our Watershed needs a more formal structure - like a federally authorized, tri-state coordinating and financing instrumentality to set goals and achieve them. This crisis is too significant to punt along. Years ago the Tennessee Valley Authority was created over an 8 state region to aid their development. More recently, the Everglades and the Chesapeake Bay created organizations to meet their particular environmental challenges. The Bureau of Reclamation has served 17 western states in the desert west for 100 years. The Great Lakes has no such mechanism.

Such a public-private partnership could aim to lift some of the management and infrastructure financing burden from communities trying to do the right thing.

To succeed, we need science, we need one another, and we need an organization empowered and capable to meet the challenge.

Let us be heartened in our quest by this Daniel Webster quote:"Let us develop the resources of our land, call forth its powers, build up its institutions and ask whether we in our time and generation may not perform something worthy to be remembered."

Lake Erie's future depends on our resolve.

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November 18, 2014

Chairman John Shimkus
Environment & Economy Sub-Committee
Committee on Energy and Commerce
2125 Rayburn House Office Bldg.
Washington, DC 20515

Dear Chairman Shimkus,

The Ohio Farm Bureau Federation is the largest general farm organization in the state, with members in all 88 counties. Our organization's mission is to forge a partnership between farmers and consumers that benefits each other.

Lake Erie's water is no longer a discussion limited to tourism directors, fishermen, farmers and families who have a direct business or personal attachment to the lake. The lake's water is now on the minds of 400,000 of our fellow Ohioans who suddenly had nothing to drink for two days this summer. It's on the minds of small businesses that were forced to close. Clearly, it's on the minds of policymakers such as yourselves. And it's on the minds of citizens worldwide who are watching how we respond.

Responding to environmental challenges is what farmers do. Whether it was the Dust Bowl of the 1930s or soil erosion in the 1980s and 1990s, farmers have a proven record of adapting the way they farm in order to protect natural resources. We'll do the same now, as water quality moves to the forefront of our most pressing challenges.

It's our belief that one of the best things farmers can do is to work collaboratively on both short- and long-term solutions. That idea of cooperation is what led Ohio Farm Bureau to launch the Healthy Water Ohio initiative. More than a year ago, we partnered with conservation groups, bottlers, tourism agencies, lawn care companies, utilities, health agencies, educators, water providers and other farm groups to study the challenges that face Ohio. The fact-finding effort is underway and will lead to a 20- to 30-year strategy for protecting and improving the state's water resources. Two northwest Ohioans are serving on Healthy Water Ohio's steering committee: Larry Fletcher who directs the tourism efforts of Lake Erie Shores and Islands and Jack Williams who oversees the water utilities for the village of Ottawa, which is in the Western Lake Erie Basin.

Specific to agriculture, Ohio Farm Bureau appreciates how important Lake Erie is to the economy and to quality of life, both locally and statewide, and we accept that we need to be a part of solving the lake's problems. As we move toward those solutions, there are a couple of points that we hope the discussions include.

First, is that we should consider water quality and food production simultaneously. Clean water cannot come at the expense of food production nor can farming trump the need for clean water.
Fortunately, we can have both. One is not exclusive of the other.

Clearly, our ability to protect both water and farming will be influenced greatly by the policies adopted by the state of Ohio as well as federal and even International laws, regulations and agreements. As the discussion on

(cont.)

policy moves forward, we suggest that we not only focus on the end result but give thoughtful consideration to the specifics of how we should get to that result. Ready, fire, aim is not a sound model for making public policy.

We would suggest, too, that while we're looking at ways farmers can make changes to their farming practices over the long term, we look also at what other fixes are appropriate to address other sources of phosphorus or to treat drinking water. If short-term infrastructure improvements can be of help, Farm Bureau would be supportive. We need action items that can be done now while we begin work on long-range solutions.

While most of what farmers can do will take time, they are not sitting idly by. They have already voluntarily reduced phosphorus applications in the Lake Erie watershed by more than 180,000 pounds. They're learning new fertilizer practices that will further reduce nutrient runoff. They're investing tens of millions of dollars of their own money in establishing conservation practices on their farms and more than $1 million-into edge-of-field research to better learn how to prevent nutrients from escaping their fields. They're working to get federal farm bill monies invested into Lake Erie improvements.

At Ohio Farm Bureau, we committed $1 million to our Water Quality Action Plan to fund research and demonstration programs, facilitate training and provide additional staff to support farmers' efforts. We'll work with Ohio State University's College of Food, Agricultural and Environmental Sciences, which also put forth $1 million for its Field to Faucet initiative, which will result in improved farming practices, better water treatment and other effective steps. And we look forward to collaborating with various federal agencies to ensure that their resources and dollars are targeted effectively.

Within state government, Gov. John Kasich and his administrators at the Ohio Department of Agriculture, Ohio EPA and Ohio Department of Natural Resources have worked closely with the regulated community to seek workable solutions. Two pieces of state legislation are noteworthy.

Passed this summer was legislation that is the first of its kind in the nation, which requires all qualifying farmers to obtain mandatory certification training if applying fertilizer in the state of Ohio. Over 700 farmers packed the first three training sessions offered by Ohio State University this fall. And just this week, Ohio Farm Bureau supported another bill that will ban application of manure and fertilizer on frozen and snow-covered ground in the Western Lake Erie Basin.

In closing, we would like to join all others who have expressed their admiration for the people of Toledo and how they handled an extremely difficult situation. Going forward, Ohio Farm Bureau is committed to doing what we can to ensure that Toledo, or any other Ohio city, does not have to go through such an experience again.

Ohio farmers are proud that they feed our families and provide strength to our local economies. They're equally proud to be willing contributors to the quality of Lake Erie and Ohio's other vital water resources. Thank you for the opportunity to provide this written statement.

Sincerely,

Stephen F. Hirsch
OFBF President

cpy: John C. "Jack" Fisher
OFBF Cabinet

Association of State Drinking
Water Administrators

November 14, 2104

The Honorable John Shimkus
The Honorable Paul Tonko
Subcommittee on Environment and the Economy
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515

Re: Statement for the Record for November 19, 2014 Hearing on Harmful Algal Blooms in Drinking Water

Dear Chairman Shimkus and Ranking Member Tonko:

I would like to take this opportunity to share the perspectives of the Association of State Drinking Water Administrators (ASDWA) in connection with the November 19, 2014 hearing on this subject before the Environment and Economy Subcommittee. ASDWA represents the collective interests of the fifty states, the five territories, the Navajo Nation, and the District of Columbia. We have provided our comments below in the form of answers to some commonly asked questions on this topic.

Why are Harmful Algal Blooms (HABs) of the type that took place in Toledo occurring across the country – seemingly, with increasing frequency? What can be done to address the root causes of these problems and prevent these kinds of incidents?

We believe these problems are ultimately the result of point and nonpoint sources of nitrogen and phosphorous pollution, coupled with recent extreme weather conditions that can exacerbate the proliferation of algae and may cause it to occur earlier and longer. Targeted efforts to address all sources of nutrient pollution are needed. Nonpoint sources of nitrogen and phosphorus, largely from agricultural sources, must be the target of voluntary and, where appropriate, mandatory conservation measures, supported by actions at the Federal, state, and local levels. Point sources of nitrogen and phosphorus from Publicly Owned Treatment Works (POTWs) – while typically not contributing the lion's share of these contaminants, can nonetheless be problematic in specific watersheds. Such pollutant discharges can be addressed through requirements in National Pollutant Discharge Elimination System (NPDES) permits. Failing on-site septic systems can be another significant contributor of nutrient loadings in localized areas. ***This multi-faceted pollution challenge requires a cooperative and collaborative pollution control approach designed to leverage a variety of tools and authorities by a number of key stakeholders.***

Why not just simply remove algal toxins at the water treatment plant – why do we need to be proactive and preventative? Are there treatment approaches that are effective in removing algal toxins?

The most reliable -- and, in the long run, cheapest – approach to providing safe water at that tap is a *multi-barrier approach*, that starts with protecting sources of drinking water. A reactive approach to HABs and algal toxins that does not include source protection and places all of the burden for removing harmful algal toxins on the water treatment facility is an expensive, ineffective, and unpredictable way to proceed. While there are treatment techniques that can be effective in removing algal masses and oxidizing algal toxins, these approaches can be complicated, expensive, and challenging. For instance, certain kinds of treatment approaches can *lyse* the algal cells, thereby releasing the toxins. Treatment is one of the barriers in the multi-barrier approach to ensuring safe drinking water, but is most effective as one of the final barriers, rather than the *only* barrier. ***Both states and water systems would appreciate future guidance (by EPA as well by organizations such as the Water Research Foundation) on effective treatment approaches for removing algae and algal toxins.***

Are there health benchmarks to tell us serious an algal toxin problem is and when a "do not drink" order needs to be issues for a public source of drinking water? Is a Federally promulgated Maximum Contaminant Level applicable to water at the tap needed?

There are health benchmarks available from international consensus bodies, such as the World Health Organization. In addition, a number of states have developed their own health reference levels. We also understand that the U.S. EPA is planning to publish a Health Advisory (HA) value (which can serve as guidance for states and water systems) for some of the most commonly identified algal toxins in the Spring of 2015. ***We applaud and welcome those planned HA development efforts and recommend they be expedited.*** In addition, EPA has included cyanotoxins on their Contaminant Candidate List (CCL). The Agency will ultimately make a decision, based on their analysis of the best available health effects and occurrence data, whether or not algal toxins should be regulated by a National Primary Drinking Water Regulation. While we believe there is an immediate need for national advisory levels, we also believe that the deliberative Safe Drinking Water Act process should be carried out and not short-circuited by a legislative mandate to regulate one or more toxins. ***Targeted research on both health effects and occurrence levels should be carried out, as needed, to inform near term actions, such as periodic revisions to Health Advisory values as well as to support the longer term CCL process.***

What tools are needed to aid us in our collective efforts to both be proactive and to better respond to incidents when they occur?

There are currently several analytical methods for measuring the concentration of algal toxins in drinking water. Each has their advantages and disadvantages in terms of cost, precision, accuracy, and applicability. ***There is a near term need for national guidance on affordable and reliable analytical methods for algal toxins.*** Such guidance should address the appropriateness and uses of these various analytical methods, including guidance and information about what each method tells us and how analytical results from various methods can be used in tandem with one another (e.g., initial screening methods followed by more precise methods).

What steps can be taken to better and anticipate potential problem areas for the *next* algal bloom season?

We believe that an integrated and thoughtful approach to analyzing existing Federal, state, and local data and information can help us collectively better prepare for and anticipate future HAB challenges. For instance, ongoing support from NOAA/NASA in the identification of blooms, particularly in Lake Erie, but also in other water bodies can be extremely helpful. In addition, data bases maintained by U.S. EPA, such as the Nitrogen-Phosphorous Pollution Data Access Tool (NPDAT) can serve to help focus and concentrate our collective efforts. These national snapshots can then be informed by state and local data and information such as algal bloom histories and customer taste & odor complaints at water treatment facilities.

Thank you very much for this opportunity to provide these comments on this important and timely topic. Please contact me at 703-812-9505 or jtaft@asdwa.org if I can provide any additional information.

Sincerely,

James D. Taft, Executive Director
Association of State Drinking Water Administrators

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International Bottled Water Association

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August 6, 2014

The Honorable John Kasich
Governor of Ohio
Riffe Center, 30th Floor
77 South High Street
Columbus, OH 43215

Dear Governor Kasich,

The International Bottled Water Association (IBWA) would like to commend you and your administration for the immediate and coordinated response to the recent water emergency in Toledo, Ohio. The bottled water industry is very familiar with the needed response to events such as natural disasters, water main breaks, and other incidents that compromise the public water system. IBWA therefore appreciates the recent efforts undertaken by the state and the city of Toledo to ensure that citizens received clean, potable water during this crisis.

IBWA is the national trade association that represents all segments of the bottled water industry, including spring, artesian, mineral, sparkling, well, groundwater and purified bottled waters. Founded in 1958, IBWA member companies include water producers, distributors and suppliers throughout the United States, including several companies conducting business in Ohio. While we represent companies of all sizes, the vast majority of our members are small, locally- owned companies, with 60% reporting less than $2 million in annual gross sales and 90% reporting less than $10 million in annual gross sales. IBWA's mission is to serve the members and the public by championing bottled water as an important choice for healthy hydration, and promoting an environmentally responsible and sustainable industry.

The bottled water industry is always there to help during a natural disaster or other emergency situation. And every year, IBWA members respond to requests -- both big and small -- to provide bottled water to those in need. IBWA members immediately stepped forward to reroute trucks and coordinate with local suppliers to provide Toledo citizens with safe, clean, bottled water when the public water system was contaminated by a toxin from an algae bloom in Lake Erie. We stand ready to assist when your state is in need.

While it appears that the conditions associated with this event have subsided, please know that the bottled water industry is always ready to help in any way to assist in providing safe, clean, healthy water.

Please contact me should you have any questions or if we can be of any further assistance.

Sincerely,

Joe Doss

Joe Doss
President and CEO

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International Bottled Water Association

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August 6, 2014

The Honorable D. Michael Collins
Mayor of Toledo, Ohio
One Government Center
Suite 2200
Toledo, OH 43604

Dear Mayor Collins,

The International Bottled Water Association (IBWA) would like to commend you and your administration for the immediate and coordinated response to the recent water emergency in Toledo, Ohio. The bottled water industry is very familiar with the needed response to events such as natural disasters, water main breaks, and other incidents that compromise the public water system. IBWA therefore appreciates the recent efforts undertaken by the city of Toledo and the state to ensure that citizens received clean, potable water during this crisis.

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Sincerely,

Joe Doss
President and CEO

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November 18, 2014

The Honorable John Shimkus
Chairman, Subcommittee on Environment and the Economy
House Energy and Commerce Committee
2151 Rayburn House Office Building
Washington, DC 20515

The Honorable Paul Tonko
Ranking Member, Subcommittee on Environment and the Economy
House Energy and Commerce Committee
2322A Rayburn House Office Building
Washington, DC 20515

Dear Chairman Shimkus and Ranking Member Tonko,

On behalf of the members of the International Bottled Water Association (IBWA), headquartered in Alexandria, Virginia, thank you for the opportunity to provide this statement for the subcommittee's hearing on cyanotoxins in drinking water.

Founded in 1958, IBWA's membership includes U.S. and international bottlers, distributors, and suppliers who are committed to providing safe, high-quality bottled water products. IBWA members make all types of bottled water products, including spring, mineral, purified, artesian, and sparkling.

The bottled water industry supports a strong public water system, which is important for providing all citizens with clean, safe drinking water. However, during challenging times, such as a natural disaster, emergency, or other events that cause tap water to be unsafe or unavailable, the bottled water industry is committed to ensuring that safe, quality bottled water is made available to emergency support organizations, city and state governments, relief centers, retailers, and other points of distribution. This was evident most recently when IBWA members provided the citizens of Toledo, Ohio with safe, clean, bottled water when the public water system was contaminated by a cyanotoxin from an algae bloom in Lake Erie.

When the Toledo public water system was contaminated by this cyanotoxin, IBWA members immediately stepped forward to re-route delivery trucks and coordinate with local suppliers to provide Toledo citizens with safe, clean bottled water. We also reached out to Ohio Governor John Kasich and Toledo Mayor Michael Collins to commend them for their rapid and well-coordinated response to the crisis and offered our assistance should the community face additional challenges. Please see the communications that were sent by IBWA on August 6, 2014, which are included with this testimony.

Smart planning and preparing for one's water needs can make a big difference in the ability to get through and recover from an emergency situation or natural disaster. When preparing for a natural disaster or other emergency, the Federal Emergency Management Agency (FEMA) specifically recommends that store-bought bottled water be part of everyone's supplies; at least one gallon per-person, per-day for three days. Storing bottled water is a safe and convenient way to ensure that you have an adequate supply of water on hand.

Throughout the years, bottled water companies have responded to the need for clean water in such incidents as the 2013 chemical spill in Charleston, West Virginia; Hurricanes Sandy and Katrina; and numerous floods, wild fires, and earthquakes. These events serve as stark reminders for people to re-assess their risks and update their emergency plans. While catastrophic situations are thankfully rare, boil alerts and other types of public water system disruptions are frequent occurrences across the country. In addition, continued volatility in the weather across the nation only reinforces the importance of always being prepared for unexpected natural disasters and dangerous weather.

As stated earlier in this letter, the bottled water industry supports a strong public water system because it provides citizens with clean and safe drinking water. IBWA appreciates the Congress's passage earlier this year of the Water Infrastructure Finance and Innovation Authority, which supports the maintenance and improvement of America's water infrastructure. This is accomplished through mechanisms such as the state revolving fund and providing access to low cost or no cost capital for water infrastructure improvements.

Many bottled water companies use public water sources for their products. Once that water enters the bottled water plant several processes are employed to ensure that it meets the U.S. Food and Drug Administration's (FDA) purified water standard. These treatments may include one or more of the following: reverse osmosis, distillation, micro-filtration, carbon filtration, ozonation, and ultraviolet (UV) light. The finished water product is then placed in a bottle under sanitary conditions and sold to the consumer.

Purified bottled waters that are sourced from public water systems are not subject to cyanotoxins due to the treatments that are used to produce these products. For example, granular activated carbon filtration and reverse osmosis will both remove algal cyanotoxins. Natural bottled waters (e.g., spring water, artesian well water) come from groundwater sources and are therefore protected from surface water contamination that might contain cyanotoxins. Moreover, algae cannot survive in subterranean groundwater aquifers in the absence of light.

Bottled water is comprehensively regulated by the FDA as a packaged food product. FDA regulations establishing Standards of Identity, 21 CFR §165.110(a), and Standards of Quality, 21 CFR §165.110(b), for bottled water were supported by the industry. In 1996, the industry worked with Congress to mandate that FDA standards for bottled water be as protective of the public health as Environmental Protection Agency (EPA) tap water regulations (§410 of the Food, Drug, and Cosmetic Act). And, in some very important cases like lead, coliform bacteria, and *E. coli*, FDA bottled water regulations are more stringent than EPA tap water standards.

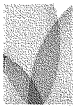
The bottled water industry is a strong supporter of our environment and our natural resources. For example, during the past several years, the industry has demonstrated this commitment by significantly reducing the average weight of plastic water bottle containers. According to Beverage Marketing Corporation, between 2000 and 2011, the average weight of a 16.9-ounce PET plastic bottle has declined 47.7% to 9.89 grams, saving 3.3 billion pounds of PET resin. In addition, all bottled water containers are 100% recyclable and many bottled water companies now use bottles made from 50, 75, and even 100 percent recycled PET (rPET) plastic. Data derived from EPA figures demonstrate that plastic water bottles make up less than one-third of one percent of the entire U.S. waste stream. And a 2014 study conducted by the Antea Group shows that bottled water has the lowest water use (1.32 liters per liter; including the liter that is consumed) and lowest energy use (0.24 megajoules per liter) of any packaged beverage.

The bottled water industry is always there to help during a time of natural disaster and emergency situations. Every year, IBWA members respond to many requests – both big and small – to provide bottled water to the victims of these events. We stand ready to assist whenever communities across America are in need.

We appreciate the opportunity to provide the Subcommittee with our views. If you would like more information or have further questions, please do not hesitate to contact us.

Sincerely,

Joseph K. Doss
President & CEO



The Fertilizer Institute
Nourish, Replenish, Grow

Chris Jahn
President

November 19, 2014

The Honorable John Shimkus
Chairman, Subcommittee on Environment and the Economy
Energy & Commerce Committee
United States House of Representatives
Washington, DC 20515

The Honorable Paul Tonko
Ranking Member, Subcommittee on Environment and the Economy
Energy & Commerce Committee
United States House of Representatives
Washington, DC 20515

RE: November 19, 2014 Hearing Entitled: "Cyanotoxins in Drinking Water."

Dear Chairman Shimkus and Ranking Member Tonko:

On behalf of the members of The Fertilizer Institute (TFI), thank you for the opportunity to provide comments on the November 19, 2014 hearing entitled "Cyanotoxins in Drinking Water." Our comments below will focus on the fertilizer industry's continued commitment to environmental stewardship by providing an overview of the many actions we are undertaking to improve the adoption of fertilizer best management practices to improve the sustainability, efficiency and productivity of agricultural systems, which can subsequently reduce nutrient runoff and positively impact water quality.

The Fertilizer Institute is the leading voice of the fertilizer industry, representing the public policy, communication and statistical needs of producers, manufacturers, retailers and transporters of fertilizer. The Institute's members play a key role in producing and distributing vital crop nutrients, such as nitrogen, phosphorus and potassium, which are used to replenish soils throughout the United States that in turn produce healthy and abundant supplies of food, fiber and fuel.

The World's population is predicted to reach 9.4 billion people by 2050. Industry experts agree that increased food production will only be achieved by intensified crop production and not by an expanded arable land base. As a result, commercial fertilizers have a critical role to play in boosting crop production to the levels necessary to meet the demands of this rapidly growing world population. Crop nutrients such as nitrogen, phosphorus, potassium, and secondary and micronutrients such as sulfur, calcium, zinc and iron are responsible for between 40 and 60 percent of today's total food production and will be a necessary component in producing

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nutritious food in the most environmentally sensitive manner possible.

4R Nutrient Stewardship

Meeting global food demand is not enough and the fertilizer industry today is also committed to promoting science-based, sustainable fertilizer best management practices that boost crop production while minimizing impacts to the environment. At the heart of that commitment is what is known as 4R nutrient stewardship, a framework to achieve cropping system goals, such as increased production, increased farmer profitability, enhanced environmental protection and improved sustainability.

The 4R nutrient stewardship principles are the same globally, but how they are used locally varies depending on field and site specific characteristics such as soil, cropping system, management techniques and climate. The scientific principles of the 4R framework include:

Right Source – Ensure a balanced supply of essential nutrients, considering both naturally available sources and the characteristics of specific products, in plant available forms.

Right Rate – Assess and make decisions based on soil nutrient supply and plant demand.

Right Time – Assess and make decisions based on the dynamics of crop uptake, soil supply, nutrient loss risks, and field operation logistics.

Right Place – Address root-soil dynamics and nutrient movement, and manage spatial variability within the field to meet site-specific crop needs and limit potential losses from the field.

It is important to stress that all four "Rs" must be used together because there is no single practice or "silver bullet" that will prevent nutrients from being lost to the environment.

In 2011, the United States Department of Agriculture (USDA) revised its standard for managing farm nutrients with a goal of encouraging farmers to employ new technologies to reduce nutrient runoff and improve water quality. The 4Rs are a component of this Natural Resources Conservation Service (NRCS) Conservation Practice Standard Code 590. For more information on 4R nutrient stewardship, I invite you to visit http://www.nutrientstewardship.com.

4R Research Fund: Demonstrating the Impacts of 4R Nutrient Stewardship

In addition to the 4R Nutrient Stewardship Program, the fertilizer industry has established the 4R Research Fund with the goal of developing sustainability indicators and environmental impact data for implementation of 4R nutrient stewardship across North America. It provides needed resource support with a focus on measuring and documenting the economic, social and environmental impacts of 4R Nutrient Stewardship. The fertilizer industry has already committed $7 million toward the research fund.

Having just completed its first year in existence, to date the fund has granted nearly $2.4 million in support of science-based research aimed at addressing cropping system productivity and concerns regarding nutrient losses into the environment. USDA's Agricultural Research Service (ARS), for example, has been awarded funds for a project in partnership with Heidelberg University, Ohio State University, The Nature Conservancy and the International Plant Nutrition

Institute (IPNI) to evaluate the impacts of adopting practices associated with 4R Nutrient Stewardship, as well as the impact of the Western Lake Erie Basin (WLEB) 4R Certification program on crop productivity and profitability, water quality, and perceptions of growers, nutrient service providers and residents. For additional information on the 4R Research fund and the list of current projects, I invite you to visit http://www.nutrientstewardship.com/funding.

4R Nutrient Stewardship Certification Program

This year, the agriculture community in Ohio, specifically in the Western Lake Erie Basin launched the 4R Nutrient Stewardship Certification Program for fertilizer retailers. The program is a stakeholder driven initiative aimed at the long-term improvement of Lake Erie's water quality. This new program provides a consistent, recognized standard for agricultural retailers in Indiana, Michigan and Ohio where surrounding waters drain into Lake Erie.

The 4R Nutrient Stewardship Certification Program ensures that participating agricultural retailers, service providers and other certified professionals utilize proven best management practices based on the 4Rs when providing agronomic advice or services to farmers. This approach provides a science-based framework for plant nutrition management and sustained crop production, while considering specific individual farms' needs. We are pleased to inform you that 49 agricultural retailers have already signed up for the program. Requirements and additional details about the program are available at www.4Rcertified.org.

Increased Fertilizer Use Efficiency

Data released by the U.S. Department of Agriculture in May 2011, shows that between 1980 and 2010, U.S. farmers increased corn production 87.5 percent while using 4 percent fewer fertilizer nutrients (see attached). Although the factors that contribute to increasing food prices and food scarcity are complex, one thing is certain – the use of fertilizer is a necessary component in the solution to further increase efficient and environmentally sensitive production of food for the world.

TFI would like to thank the Subcommittee for the opportunity to submit these comments for the hearing record. We look forward to continuing to work with you on this and other important agriculture issues. If you or your staff would like to discuss this letter or the enclosed materials, please contact TFI Vice President of Legislative Affairs, Clark Mica via email at cmica@tfi.org or telephone at (202) 515-2725.

Sincerely,

Chris Jahn
President

Enclosures

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November 19, 2014

The Honorable John Shimkus
Chairman
Environment and the Economy Subcommittee
Energy and Commerce Committee
U.S. House of Representatives
Washington, DC 20515

The Honorable Paul Tonko
Ranking Member
Environment and the Economy Subcommittee
Energy and Commerce Committee
U.S. House of Representatives
Washington, DC 20515

Dear Chairman Shimkus and Ranking Member Tonko,

The Association of Metropolitan Water Agencies (AMWA) appreciates the opportunity to submit comments for the record of the subcommittee's hearing on cyanotoxins in drinking water supplies.

Last summer's algal bloom in Lake Erie caused 400,000 people in northwestern Ohio to lose access to drinking water for three days. The event plainly demonstrated the dangers posed to drinking water supplies by nutrient-fed cyanotoxins like microcystin, and highlighted the need for transparent policies to prevent future algal blooms from introducing comparable problems at similarly situated utilities across the country.

AMWA hopes today's hearing will mark the first steps toward a more comprehensive federal policy that provides water utility managers with additional information about public health risks related to microcystin, reduces agricultural nutrient runoff that is a leading contributor to algal blooms, and spurs investment in resources to help communities build resilience to toxic algal blooms into their drinking water infrastructure.

Human Health Effects Information for Microcystin and Other Algal Toxins

Each summer algal blooms develop in the shallow western end of Lake Erie, as algae feed on nutrient-rich runoff that reaches the water body. As the algae multiply and form a green scum on the water surface, they also release cyanotoxins into the surrounding waters. This is what leads to risks to drinking water supplies.

The Lake Erie algal bloom that occurred this past August was concentrated around Toledo's water intake, and led to contamination of the city's water supply by microcystin. Microcystin is a common class of cyanotoxins that, according to EPA, causes human reactions such as abdominal pain, vomiting and diarrhea, kidney damage, and potential tumor growth promotion.[1] But while EPA has included cyanotoxins on the agency's three drinking water Contaminant Candidate Lists (CCL1 in 1998, CCL2 in 2005, and CCL3 in 2009), to this point the lack of

[1] United States Environmental Protection Agency, "Cyanobacteria and Cyanotoxins: Information for Drinking Water Systems," July, 2012. http://water.epa.gov/sci tech/swguidance/standards/criteria/nutrients/upload/cyanobacteria_factsheet.pdf.

standardized analytical methods for individual toxins like microcystin has prevented the contaminant's advancement to the next phase of the regulatory process – monitoring under the Unregulated Contaminant Monitoring Rule (UCMR).[2]

In response to more frequent algal blooms across the country, EPA has stepped up its efforts to develop scientifically sound standardized analytical methods for microcystin and other algal toxins. AMWA believes EPA should continue to act with a sense of urgency in these efforts. Ideally, appropriate analytical methods will be available in time for the agency to include cyanotoxins on EPA's list for monitoring under UCMR 4. Collection of such occurrence data under the UCMR will provide a vital foundation for the additional risk analyses that must be performed in accordance with Safe Drinking Water Act (SDWA) mandates. These analyses will, in turn, properly inform future policy decisions from EPA and other local, state and federal agencies intended to ensure microcystin and other algal toxins do not pose human health risks if they reach drinking water supplies.

When elevated levels of microcystin are detected in public water supplies, the lack of specific information from EPA presently causes utilities to rely on a 1 part-per-billion safe level suggested by the World Health Organization. Newer research is available, however, so AMWA believes EPA should independently evaluate all the latest available science and perform its own rigorous analyses of the potential health effects of microcystin and other algal toxin exposures.

As this process moves forward, we appreciate that EPA is also working on an expedited health advisory for microcystin for dissemination prior to next summer's algal bloom season. In the near term, an advisory, including guidance on potential acute and chronic exposure risks, will help drinking water utilities and oversight authorities establish best practices to prepare for, prevent, and, if necessary, respond to future algal pollution events. Longer term, we expect EPA to carry out an impartial science-based analysis of the contaminant's appropriateness for regulation, subject to the requirements of SDWA.

Policies to Protect Waters from Agricultural Runoff

While defining safe human exposure levels for cyanotoxins is important, the best, and most cost-effective, long-range strategy to protect the public from algal pollution is to prevent bloom-causing nutrients like nitrogen and phosphorus from entering waterways in the first place. Doing so is urgently important, as an analysis of state water quality reports carried out last year by the Healthy Waters Coalition found that 80,000 miles of rivers and streams, 2.5 million acres of lakes, reservoirs and ponds, 78 percent of the assessed continental U.S. coastal areas and more than 30 percent of estuaries in the United States are impaired due to excessive levels of nitrogen and phosphorus.[3] If left unaddressed, these pollutants can find their way to drinking water intakes and cause the type of public health emergency that Toledo experienced earlier this year.

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[2] United States Environmental Protection Agency, "Nutrient Policy and Data: Policies and Guidelines." http://www2.epa.gov/nutrient-policy-data/policies-and-guidelines.

[3] Healthy Waters Coalition, January 28, 2014. http://www.amwa.net/sites/default/files/FarmBillConfLetter_1-28-14.pdf.

Any meaningful reduction in algal blooms must begin with the agricultural sector. While nonpoint runoff such as nutrient-laced agricultural pollution is exempt from federal Clean Water Act regulation, the United States Geological Survey has estimated that roughly 90 percent of nitrogen and 75 percent of phosphorus in U.S. waters originates from nonpoint sources.[4] While subjecting nonpoint source runoff to federal oversight would be the most effective solution, other helpful measures could include policies that discourage over-application of farm fertilizers andincentivize farmers to capture runoff before it leaves their fields. Without these steps, algal bacteria living in warm waters will continue to feed on this unregulated nutrient-rich runoff – thus allowing algal blooms to grow and multiply while fouling the sources of communities' drinking water.

A new Regional Conservation Partnership Program (RCPP) authorized by Congress as part of the 2012 Farm Bill is one policy that could help communities reduce threats related to algal bloom-causing pollution. The voluntary RCPP allows water utilities to partner with nearby farmers to apply for funding assistance to implement "nutrient management and sediment reduction" projects, among other objectives. Backed by this funding, utilities and farmers are incentivized to develop mutually acceptable measures that reduce farm runoff and keep algal-fueling nutrients out of sources of drinking water. But to ensure the success of the RCPP Congress should commit to funding the program while also considering new measures promoting agricultural accountability for nutrient management.

Resources to Help Utilities Counter Nutrient Pollution

When seeking to protect water supplies against the threat of nutrient pollution, utilities should consider a range of response strategies. Some communities, such as Nashville, have largely avoided excessive nutrient build up by working with the U.S. Army Corps of Engineers to employ watershed management techniques such as constant flushing in source water basins. We encourage other water systems to explore similar proactive steps, and urge Congress to fully fund programs – such as EPA's Nonpoint Source Implementation Grants (also known as the 319 Program) – that could help states and communities manage watersheds and preemptively address potential algal growth.

These preventative measures will not always be possible or effective in every situation, so Congress should utilize existing water infrastructure financing assistance programs to help water utilities rid source waters of contaminants. One such project is underway in Columbus, Ohio, where the city is building a $70 million treatment system that will help protect against algal pollution beginning in 2016.[5] Another example of utility investment to combat agricultural runoff is in Iowa, where in the early 1990s Des Moines Water Works built a $4.1 million nitrate

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[4] United States Geological Survey, *U.S. Geological Circular 1225: The Quality of Our Nation's Waters – Nutrients and Pesticides,* 1999. http://pubs.usgs.gov/circ/circ1225/html/sources.html

[5] Arenschield, Laura. "Toledo bearing full brunt of Lake Erie algae bloom." *The Columbus Dispatch,* August 4, 2014. http://www.dispatch.com/content/stories/local/2014/08/04/this-bloom-is-in-bad-location.html.

removal facility to prevent runoff from elevating the city's water above the SDWA standard for nitrate. Last year Des Moines operated the facility for 74 days, with the $7,000 per day operation cost borne by its ratepayers.

Communities that are unable to preemptively fight nutrient build up through source water management practices could more easily finance necessary nutrient removal projects if Congress were to expand access to low-cost water infrastructure funding assistance. This is why it is important for Congress to deliver robust funding for EPA's Drinking Water State Revolving Fund, as well as its new Water Infrastructure Finance and Innovation Act (WIFIA) focused on offering inexpensive loans for large-scale water infrastructure improvements. Strong appropriations for each of these programs will help communities invest in defenses against algal pollution that are necessary to protect the integrity of drinking water supplies and avoid future algal-related water service interruptions.

AMWA thanks you again for holding this important hearing on the threat of cyanotoxins to the integrity of our nation's drinking water supplies. We look forward to continuing to work with you as you examine this issue in the months ahead.

Sincerely,

Diane VanDe Hei
Executive Director

cc: Subcommittee on Environment and the Economy

TIM MURPHY
18TH DISTRICT, PENNSYLVANIA

COMMITTEE ON ENERGY AND COMMERCE
CHAIR, OVERSIGHT AND INVESTIGATIONS
ENVIRONMENT AND ECONOMY
HEALTH

CO-CHAIR, STEEL CAUCUS
CO-CHAIR, MENTAL HEALTH CAUCUS

WEBSITE: murphy.house.gov

Congress of the United States
House of Representatives
Washington, DC 20515

December 18, 2014

The Honorable John Shimkus
Chairman
Subcommittee on Environment and the Economy
Committee on Energy and Commerce
2217 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Shimkus,

Thank you for convening the hearing, "Cyanotoxins in Drinking Water." Ensuring the safety of our nation's drinking water supplies is a critical national issue, and I am encouraged that our subcommittee is taking the lead in addressing threats posted by bacterial pollution.

This past August, more than half a million residents of Toledo, Ohio could not drink their city's water because it had been contaminated by an algae bloom of cyanotoxin bacteria. Unfortunately, this was not a unique event. Lake Erie, the other Great Lakes, and many other freshwater and marine environments across the United States are susceptible to outbreaks of blue-green algae (cyanobacteria) outbreaks. In many of these cases, source water for municipal – and private – drinking water supply is affected, thereby creating a health risk for residents.

Blue-green algae is not the only threat to municipal drinking water supplies. A chemical spill near Charleston, West Virginia in January caused major disruptions for the surrounding population. It has been estimated that in 2011, more than 194 million pounds of chemicals were spilled into U.S. rivers, streams, lakes, and coastal areas – all of which had the potential to significantly disrupt drinking water supplies for nearby populations.

There are several commonly used technical solutions to address the challenges posed by the cyanotoxins released by blue-green algae. One of the solutions – granular activated carbon – is a product manufactured by Calgon Carbon, which is headquartered in my congressional district. Granular activated carbon is effective for the removal of cyanotoxins during blue-green algae outbreaks. An important aspect of the use of granular activated carbon is that it 'removes' chemicals from water rather than converting those chemicals to another form by adding more, or different chemicals to the water.

Unfortunately, not all drinking water treatment facilities are equipped with these solutions, despite the fact they could be implemented at relatively minimal costs. For

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example, the addition of granular activated carbon treatment at a mid-sized drinking water treatment plant would cost less than the monthly purchase of two 16 ounce bottles of water from the local convenience store. Use of this technology should be a vital component of any regulatory or legislative change to prevent dangerous algae blooms in the future.

Again, thank you for convening a hearing on this critical issue. I stand ready to assist you on this matter in any way possible.

Sincerely,

Tim Murphy
Member of Congress

TM:bdg

cc: The Honorable Robert Latta

GAC as a Barrier Defense to Protect Drinking Supplies from Chemical Spills

A Calgon Carbon Perspective

Dated: February 24, 2014

Background

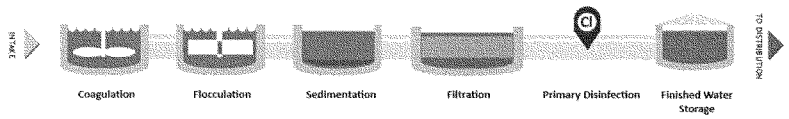
Over 200 million Americans get their drinking water from a collection of nearly 12,000 community drinking water treatment systems. These drinking water treatment systems withdraw source water from nearby surface waters, such as rivers, streams, and lakes. Many of these drinking water treatment systems are located in close proximity to a variety of industrial facilities, such as factories and storage tanks. Additionally, inland waterways which serve as a major source for drinking water are also used to as water highways for recreation and to transport industrial chemicals which present additional risks to the quality of the source water available to the drinking water treatment facility.

Despite the best efforts of both government and industry, in 2011 alone, 194 million pounds of chemicals were spilled into US rivers, streams, lakes, and coastal areas from 1,374 facilities. When these events occur, the potential exists for contamination of drinking water. There is understandably great interest on the parts of water utility management, state and federal regulators, elected officials, and the general public to prevent such spills or to provide an effective barrier defense that will protect drinking water supply should chemical spills occur.

The GAC Barrier Defense Approach

Most drinking water treatment plants in the United States are of the "conventional" design, consisting of flocculation, coagulation, sedimentation, filtration, and final disinfection processes (see below).

Typical Water Treatment Process



While the design of these conventional plants has proven effective over the years for the treatment of the organic compounds ordinarily found in surface water, they are often ineffective when faced with the often complex and sometimes exotic chemicals released from industrial sources. Some of these conventional drinking water processes can help reduce contaminant levels, but they may be quickly overwhelmed by high concentrations of chemicals. To prevent water treatment plants from discharging contaminated water into their distribution systems, an additional barrier is required. One such barrier is granular activated carbon (GAC).

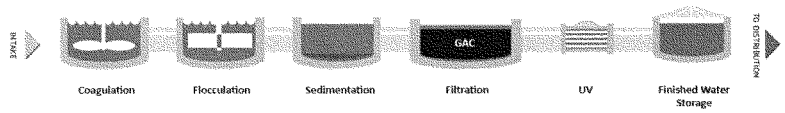
GAC has been used to protect and improve drinking water treatment systems for decades. It was first used as a technology to remove unpleasant tastes and odors from water. Later, GAC was found to be effective in removing natural organic matter (NOM) from water, which among other things made GAC an effective treatment to reduce Disinfection Byproducts (DBP), a group of regulated carcinogenic compounds formed

during the disinfection step in the drinking water treatment process. GAC has also been found to be effective as a means to remove Endocrine Disrupting Compounds (EDC) and Pharmaceutical and Personal Care Products (PPCP) from water. Beyond these applications, GAC is extremely effective for the removal of many of the kinds of chemicals present in industrial spills.

GAC works through a mechanism known as *adsorption*. Through adsorption, molecules are trapped within the structure of the GAC particle. GAC particles themselves are quite small, often around one millimeter in diameter, but GAC possessing an enormous storage capacity due to the multiplicity of channels, cracks, and crevices designed within each particle. Less than 3 grams (about the size of a single serving of sugar) of GAC has the surface area equivalent to a football field!

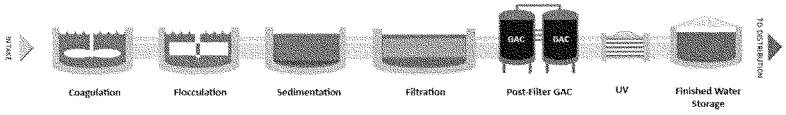
The Barrier Defense Approach envisions a GAC filtration system installed near the end of the drinking water treatment process (as illustrated below). The GAC filters would be positioned after the initial "conventional" treatment steps of coagulation, flocculation, and sedimentation. In some cases, GAC would essentially replace the existing filtration media used in the drinking water treatment process.

Typical Water Treatment Process with GAC Filtration



Alternatively, some drinking water treatment plants will install designed-for-purpose GAC contactor vessels behind the existing filters:

Typical Water Treatment Process with Post-Filter GAC Contactors



The Economics of the GAC Barrier Defense Concept

An important consideration related to implement the Barrier Defense concept is cost. As it turns out, GAC is exceptionally affordable. GAC can be implemented by a typical US drinking water utility for a cost between $10 and $40 per year for a family of four[4]. The range accounts for the size of the installation and population served. The cost will decrease on a per capita basis as the size of the drinking water treatment facility increases, due to economies of scale. These costs include engineering design, civil construction, initial purchase of the GAC (and associated equipment), and on-going operation and maintenance costs.

An example cost detail for the use of GAC is provided below for a typical mid-sized drinking water treatment facility:

Scenario: Mid-Sized Water Treatment Plant

Population Served:	160,000
Flow Rate:	17 million gallons per day (MGD)
Annual Volume of Water Treated:	6,205,000,000 gallons
Annual Household Water Use, Family of Four:	101,500 gallons
Initial Cost to Design/Construct/Install GAC System:	$6,141,000
Annual Operating and Maintenance Cost of GAC:	$227,000
Annualized 10-Year Simple Lifecycle Cost:	$841,000
Annualized Lifecycle Cost per Gallon:	$0.00014
Annual Cost for a Household of Four:	$0.00014 x 101,500 gallons = $13.75/year

Supporting the calculations above, the City of Cincinnati reports that the cost for treating drinking water with GAC is $5.00 per quarter for a single family household, or $20.00 per year[2]. These costs compare very favorably to the expense of providing this same family with bottled water, which can range from $950 to $1,800 per year[5].

Quality Drinking Water and Public Trust

Granular Activated Carbon used as a Barrier Defense by drinking water treatment facilities has the potential to not only support the routine delivery of quality drinking water but the added benefit of protecting that drinking water from chemical spills and enhancing public trust.

Perhaps the most important consideration related to the installation of a GAC-based Barrier Defense is to provide quality drinking water in accordance with federal and state regulations associated with the Safe Drinking Water Act. GAC is widely acknowledged as a very effective technology alternative to remove a wide range of chemical contaminants from water, ranging from naturally occurring materials to disinfection by-products, endocrine disruptors and pharmaceuticals, and chemicals resulting from oil spills.

Used as a Barrier Defense from the unintended introduction of chemicals resulting from spills or other situations, GAC can enhance the operations and performance of drinking water treatment facilities to help assure the delivery of safe, quality drinking water. Those enhanced operations and performance will lead to improved facility confidence and improved public trust in the drinking water supply system.

Contact For More Information:

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Ranking Member

November 18, 2014

RE: November 19, 2014 Subcommittee Hearing on "Cyanotoxins in Drinking Water"

Dear Chairman Shimkus and Ranking Member Tonko,

It was my pleasure to meet Chairman Shimkus in Pittsburgh recently with Congressman Tim Murphy. Thank you for taking the time to share your perspective and solicit input to the many important matters addressed by the Subcommittee on Environment and the Economy.

As you know, Calgon Carbon Corporation is a PA-based (headquartered in Congressman Murphy's district) manufacturer of technologies that are used to purify air and water. The application of these cost effective technologies include drinking water purification, industrial water discharges, removal of mercury emissions from coal burning power plants, removal of organic chemicals from industrial air emissions, industrial and military respirators, and many more. Our products are made in the United States and used across the United States as well as around the world.

The challenge of cyanotoxins in drinking water was widely exposed this past August following the disruptive impact on the citizens of Toledo, OH. However, this is not a unique event.

Blue-green algae (cyanobacteria) outbreaks are common in freshwater and marine environments. Lake Erie, the other Great Lakes, and many other lakes and surface water bodies across the United States are susceptible to these outbreaks. In many of those outbreaks, source water for municipal – and private – drinking water supply is impacted thereby creating a health risk for the consumers of that water.

There are several commonly used technical solutions to address the challenges posed by the cyanotoxins released by blue-green algae. Unfortunately, not all drinking water treatment facilities are equipped with these solutions.

One of the solutions – granular activated carbon – is a product manufactured by Calgon Carbon. In fact, we are the world's largest producer of granular activated carbon and produce all of it in the United States for use around the world.

You are probably familiar with this product since it is used to purify the drinking water provided by DC Water, is used in point-of-entry and point-of-use devices, and many other drinking water applications.

Granular activated carbon is effective for the removal of cyanotoxins during blue-green algae outbreaks. An important aspect of the use of granular activated carbon is that it 'removes' chemicals from water rather than converting those chemicals to another form by adding more or different chemicals to the water. We think it is always better to remove chemicals rather than add chemicals to drinking water.

While the blue-green algae impact on the City of Toledo was disruptive to that particular population, it is not the only threat to the drinking water supply of that, or other, populations across the United States. Similar to the algae toxin impact in Toledo, the chemical spill near Charleston, WV in January of this year had a similar disruptive impact on the surrounding population. It has been estimated that in 2011, more than 194 million pounds of chemicals were spilled into U.S. rivers, streams, lakes, and coastal areas – all of which had the potential to significantly disrupt drinking water supplies for nearby populations.

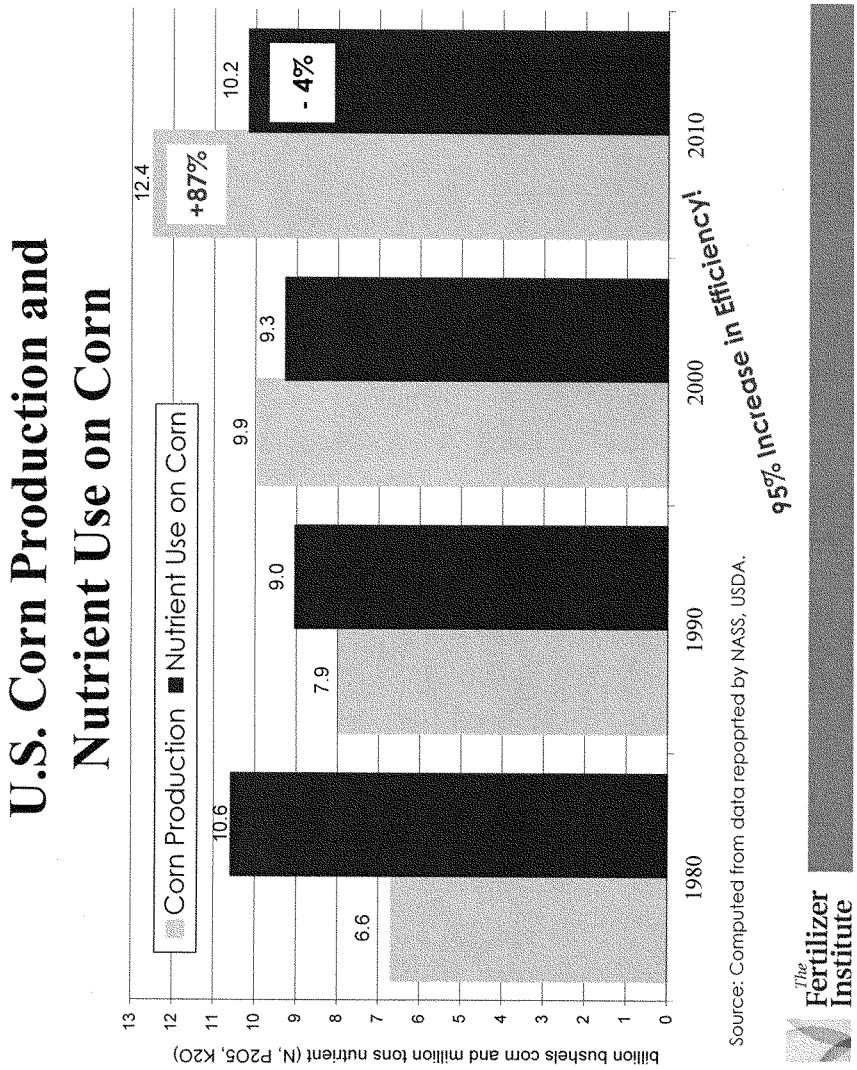
And yet there are more challenges, including drought conditions, the increasing propensity for pharmaceutical products in drinking water, chemical reaction by-products resulting from the addition of disinfection chemicals to our drinking water, and the ongoing threat of unfriendly people, groups, or nations intentionally adding chemicals to negatively impact the quality of our drinking water.

The good news is that technology solutions – granular activated carbon among them – are available to address these challenges. In fact, solutions such as granular activated carbon have the added benefit of removing all of these challenges at the same time. And this can be accomplished at very reasonable cost – for example, the addition of granular activated carbon treatment at a mid-sized drinking water treatment plant would cost less than the monthly purchase of two 16 oz bottles of water from your local convenience store.

Separately, we provided a short paper that illustrates the use of granular activated carbon as a 'barrier technology' to protect drinking water treatment facilities from the disruption that could result from the many challenges listed above. We appreciate the opportunity to provide this perspective and welcome the opportunity to continue our dialog with the Subcommittee.

Respectfully,

Robert A. McLaughlin
Vice President – Municipal Business Unit


U.S. Corn Production and Nutrient Use on Corn
Corn Production
Nutrient Use on Corn
billion bushels corn and million tons nutrient (N, P2O5, K2O)
13
12
11
10
9
8
7
6
5
4
3
2
1
0
6.6
10.6
7.9
9.0
9.9
9.3
12.4
10.2
+87%
- 4%
1980
1990
2000
2010
95% Increase in Efficiency!
Source: Computed from data repoprted by NASS, USDA.
The Fertilizer Institute

WHAT ARE THE 4Rs?

4R nutrient stewardship provides a framework to achieve cropping system goals — increased production, increased farmer profitability, enhanced environmental protection and improved sustainability. To achieve those goals, the 4R's incorporate the:

RIGHT FERTILIZER SOURCE *at the*
RIGHT RATE, *at the*
RIGHT TIME *and in the*
RIGHT PLACE.

Properly managed fertilizers support cropping systems that provide economic, social and environmental benefits. On the other hand, poorly managed nutrient applications can decrease profitability and increase nutrient losses, potentially degrading water and air.

4R nutrient stewardship requires the implementation of best management practices (BMPs) that optimize the efficiency of fertilizer use. The goal of fertilizer BMPs is to match nutrient supply with crop requirements and to minimize nutrient losses. Selection of BMPs varies by location, and those chosen for a given farm are dependent on local soil and climatic conditions, crop, management conditions and other site specific factors.

Other agronomic and conservation practices, such as no-till farming and the use of cover crops, play a valuable role in supporting 4R nutrient stewardship. As a result, fertilizer BMPs are most effective when applied with other agronomic and conservation practices.

HOW YOU CAN PUT 4R NUTRIENT STEWARDSHIP TO WORK FOR YOU!

To utilize the 4Rs to achieve your cropping system goals, apply the **Right Source** of fertilizers that are in — or are easily converted to — compounds best used by the target crop. Apply the **Right Rate** of fertilizer to match nutrient supply with crop requirements. Apply fertilizer at the **Right Time** so nutrients will be available when crop demand is high. Apply or maintain fertilizer in the **Right Place** where the crop can access the nutrients most effectively. Applying these general practices will minimize nutrient transport from fields and maximize crop uptake and utilization.

- **EDUCATE YOURSELF**
- **CONSIDER WAYS TO EXPAND YOUR 4R PRACTICES**
- **SPREAD THE WORD!**

Visit **www.nutrientstewardship.com** (available March 2011)

Information in this brochure was developed utilizing materials available from The Fertilizer Institute, the International Plant Nutrition Institute, and the Canadian Fertilizer Institute.

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4R nutrient stewardship

The Right Time for Nutrient Stewardship

IS RIGHT NOW

The Fertilizer Institute
Nourish, Replenish, Grow

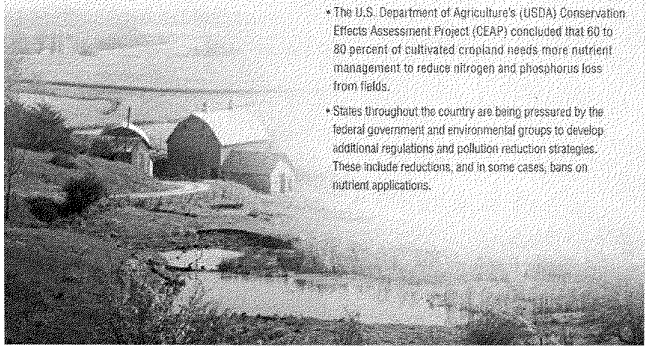
4R NUTRIENT STEWARDSHIP

WHY USE THE 4Rs RIGHT NOW?

AGRICULTURE IS FACING CHALLENGES

POPULATION PRESSURES

According to the United Nations, the global population will increase by more than two billion people in the next 40 years, and many reports have indicated that food production needs to double by 2050. Industry experts agree that increased food production will be achieved by intensified crop production and not by an expanded arable land base. Genetic and biotech seed industries have predicted yield increases of three to four percent per year. However, to optimize the yields of advanced seeds, fertilizer inputs must be optimized to provide the greatest potential for success.



REGULATORY PRESSURES

Pressure to limit the use of fertilizers is increasing. Legislative, regulatory and non-government activities, including legal action pertaining to nutrients in the environment, are taking place on national, regional, state and local levels.

- Assessments by the Environmental Protection Agency have assigned agriculture responsibility for 44 percent of the nitrogen and phosphorus being delivered to the Chesapeake Bay.
- The National Academy of Sciences cite nitrogen-based fertilizer application and animal feeding operation runoff as a large majority of the nutrient inputs within the Mississippi River Basin and Northern Gulf of Mexico watershed.
- The U.S. Department of Agriculture's (USDA) Conservation Effects Assessment Project (CEAP) concluded that 60 to 80 percent of cultivated cropland needs more nutrient management to reduce nitrogen and phosphorus loss from fields.
- States throughout the country are being pressured by the federal government and environmental groups to develop additional regulations and pollution reduction strategies. These include reductions, and in some cases, bans on nutrient applications.

ANSWERING THE CHALLENGE WITH 4R NUTRIENT STEWARDSHIP

4R nutrient stewardship can help
IMPROVE AGRICULTURAL PRODUCTIVITY:

- Optimizing nutrient management is simply good business in dealing with fluctuations in prices of fertilizers and other inputs, as well as in prices of crops sold.
- Higher crop yields are well documented with better crop and soil management.
- Improved fertilizer efficiency increases the quantity produced per acre for each unit of nutrient applied, without sacrificing yield potential.

4R nutrient stewardship can help
MINIMIZE IMPACT TO THE ENVIRONMENT:

- Adopting nutrient stewardship contributes to the preservation of natural ecosystems by growing more on less land.
- Retaining nutrients within a field's boundaries and in the crop rooting zone greatly reduces the amount that is not utilized by plants and thereby escapes into the environment as pollution.